THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

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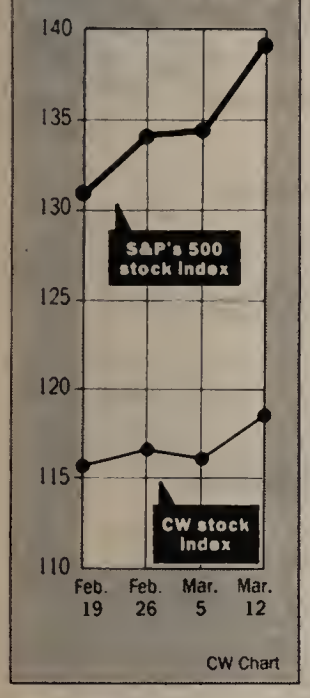
Stock update



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Despite seeing its laptop design selected for IRS use under the Zenith Data Systems label, Morrow Designs, Inc. has slipped into Chapter 11 proceedings. **Page 154.**

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Artificial intelligence and conventional computing environments are moving toward integration in the wake of several recent link announcements. **Page 47.**

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Observers of the mainframe software industry say price cutting is a cancer threatening both vendors and users. **Page 31.**

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Burroughs provides its mainframe users greater access to IBM's SNA. **Page 8.**

■

Hewlett-Packard offers site licensing options for micro software. **Page 4.**

■

Microsoft's initial public offering generated $48 million in capital for the company last Thursday, and the selling price of $21 per share was quickly bid to $28 per share in public trading by the end of the day. Chairman and founder William Gates sold 80,000 shares for $1.7 million and saw the traders value his remaining 45% share at more than $300 million.

■

Regarding rumors that his firm is considering a merger with Cullinet, Ashton-Tate President and CEO Edward M. Esber Jr. had this to say: "There is no truth to that rumor. I would only say that it would make an interesting combination."

■

The Cray-3 will pack more processors, faster computing speed and larger memory than the Cray-2 into a box "the size of a loaf of bread," Cray Research, Inc. Executive Vice-President and Chief Financial Officer John F. Carlson told a New York financial conference last week. The project of company founder Seymour Cray, the Cray-3 will use galli-

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Cullinet exec out in shuffle

Goldman resigns as firm moves to fight profit dip

By Charles Babcock

WESTWOOD, Mass. — Following nine months of disappointing profits at Cullinet Software, Inc., President Robert N. Goldman resigned Wednesday after learning that Chairman John Cullinane recruited an outside manager as vice-chairman and chief executive officer.

The new CEO, Data General Corp. executive David Chapman, would have been above Goldman in the Cullinet hierarchy, and now assumes the additional title of president of the leading independent vendor of software for IBM mainframes and compatibles.

The day after Goldman's resignation was announced, Cullinane said the company is changing tactics to cope with what he said may be a prolonged slowdown in software sales, according to securities analysts present at a Cullinet briefing.

In a phone interview with *Computerworld* last week, Goldman said, "John Cullinane has stated he decided to bring in David Chapman between himself and me. I decided the time had come to look for another opportunity."

Chapman, 51, the senior vice-president for manufacturing at DG, was named Cullinet's vice-chairman and chief executive officer effective March 28. He brings experience in manufacturing and cost management to a software company that garnered $184 million in revenue last year, ranking it among the top three independent software companies, but that is experiencing flat sales through the first three quarters of the current fiscal year. Prior to his five years at DG, Chapman spent 24 years with IBM and supervised the development of IBM's internal manufacturing information

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Burroughs in drive dispute with big users

By James Connolly

A surprise policy recently implemented by Burroughs Corp. has upset large systems users who said they believe the change in maintenance provisions may make certain old disk drives worthless if sold or even moved from one data center to another within the same company.

Users said the policy diminishes the resale value of their drives, and some said it is intended to encourage migration to a later model thin-film head disk drive. But Burroughs executives maintain, unofficially, that the severity of the situation has been greatly overrated by some users.

See **BURROUGHS** page 15

Ansa move woos corporate users

By Peggy Watt

BELMONT, Calif. — Faced with lagging corporate acceptance five months after releasing its Paradox relational data base, Ansa Software today is set to renew its bid for the large-account market with a non-copy-protected upgrade and a direct service program.

New features of both the product and corporate account program are squarely aimed at corporate customers and MIS departments, many of which are still evaluating Paradox, said President Stephen Dow. He acknowledged that only about two dozen large-account evaluators have approved the program, but he said he hopes the upgrade and new support pack-

See **ANSA** page 6

CW EXCLUSIVE

Run of the mill: California Steel molds MIS on micro base

By Maura McEnaney

Many things have changed since California Steel Industries, Inc. took over the 350-acre manufacturing facilities of Kaiser Steel Co. in Fontana, Calif., in late 1984.

Steelworkers' unions are nonexistent, smokestacks serve only as local landmarks and the one-story building that housed a data processing department consisting of 100 workers and several IBM mainframes is now used to refinish old furniture.

Today, 25 IBM Personal Computer ATs sit at the heart of California Steel's computer system, running production control and scheduling applications for the $250 million business that employs approximately 700 workers.

By using ATs during its start-up phase, California Steel was able to implement computer systems and start making steel after only three months of planning. Although an IBM System/38 was installed last August, the micros carried the company through its first nine months of operation.

Don Kendrew

"It was an ambitious project," observes Steven Gregg, corporate systems supervisor at Kaiser Steel, which maintains its corporate headquarters adjacent to the California Steel site.

"Coming into a large corporation, the traditional approach would be to install a single business computer. Traditionally, everything has been on a mainframe," Gregg says.

Local manufacturer Michael Wilkinson bucked tradition when he purchased and resurrected California's only steel manufacturing plant. Kaiser closed its mill at the end of 1983, largely because of high freight costs and poor market conditions.

Over the past two decades, U.S. steel companies, buffeted by foreign competition and the cost of aging manufacturing facilities, have been going out of business, diversifying or merging. But Wilkinson pulled

See **CALIFORNIA** page

NEWSPAPER

Cincom drops enhancements for Total, continues support

By Charles Babcock

CINCINNATI — Cincom Systems, Inc. notified its customers last month that it halted development of enhancements for its Total data base management system; it will offer credits to users who purchase its new relational system, Supra.

Total was a leading data base management system in the 1970s, but in recent years Cincom competitors, such as Applied Data Research, Inc. and Cullinet Software, Inc., overtook it with their own data base management systems.

President Dennis J. Yablonsky said Cincom has been indicating to users for some time that it would shift its emphasis to a relational model. The February notice made it official.

He said Cincom will continue to provide all levels of support for Total, including field service. He warned, however, that the cost of service will tend to rise as the Total user base shrinks. Cincom expects to see 80% of the users who switch from Total to Supra complete their migration during the next three years.

Cincom is giving customers a credit of 100% of the 1986 purchase price for Total and all related products, regardless of when they purchased them, against the price of Supra. Supra is priced at $200,000 running under IBM's DOS operating system and $275,000 under IBM's OS operating system. The credits are worth $80,000 to $100,000 and are being offerred through the end of 1986, Yablonsky said.

Cincom has 2,000 installed Total sites, he said.

Users of Total said they anticipated the announcement, and some said they had already started lessening their dependence on it.

"We haven't done any new application development for Total in the last three years," said John A. Bossert, data processing manager at Allendale Insurance Co. in Johnston, R.I. He said his company was looking at relational models but would first complete its conversion to IBM VSAM files. The conversion will allow the firm to migrate data into the relational data base of its choice. No data base has been chosen yet, he said.

FCC proposal may allow regionals to sell equipment with network services

By Mitch Betts

WASHINGTON, D.C. — The Federal Communications Commission, chipping away at its divestiture regulations, last week proposed allowing the seven regional holding companies to combine the marketing of terminal equipment and network services, subject to certain safeguards against anticompetitive action.

The proposal, which faces public comments before becoming final this fall, would eliminate the FCC rule requiring the regional companies to market terminal equipment only through separate subsidiaries.

To prevent the regionals from using their local telephone service monopolies to subsidize equipment sales or to obtain unfair advantage over independent vendors, the FCC proposed several "nonstructural" safeguards.

These safeguards include FCC oversight of their accounting practices and a requirement to disclose technical information about the network that affects terminal interconnection.

Worried that the former Bell operating companies will use their exclusive data bases on network customers to help them tailor equipment proposals to particular customer needs, the FCC said it will consider strict limits on their use of that data for equipment marketing. The FCC said it may require that all terminal equipment vendors be given access to the customer data, particularly data about the sought-after multiline business customers.

The FCC action responded to petitions from four regional holding companies, which argued that the structural separation rule was artificial and hampered their efforts to compete with unregulated firms to provide end-to-end service. Independent equipment makers and vendors, however, are skeptical that the nonstructural safeguards will prevent anticompetitive action by the telephone companies.

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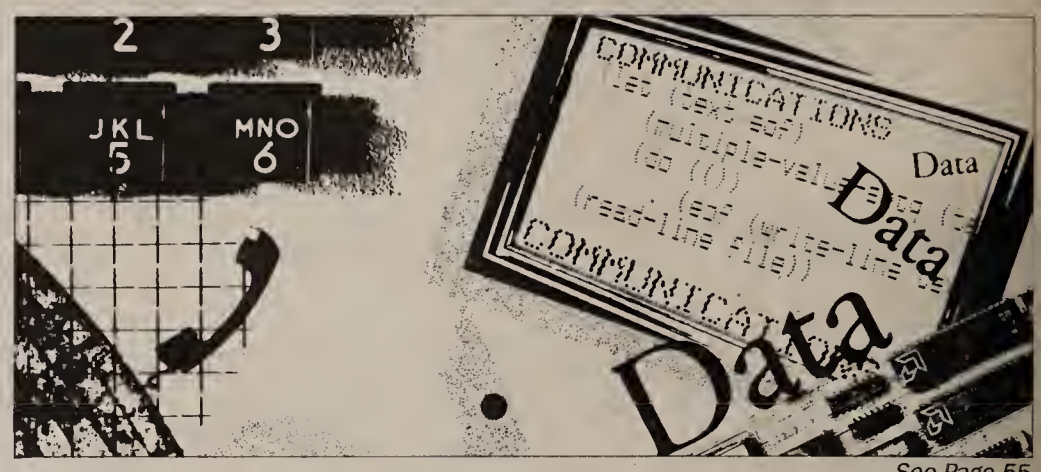

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Hayes Microcomputer has released a version of its Smartcom II communications software that enables IBM Personal Computers on the PC Network to share modems and communications ports/ **43**

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Morrow Designs files for bankruptcy just two weeks after its microcomputer design won Zenith Data Systems the IRS laptop contract/ **154**

EXECUTIVE REPORT

Managing voice and data communications is increasingly becoming an MIS function. It is, however, a difficult task to merge these two diverse disciplines, and most top companies have yet to solve the problem completely. By Glenn Rifkin/ **55**

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Bell offspring compete in the open market: The seven regional holding companies, now 2 years old, have diversified into retail sales, systems integration and third-party maintenance. By Bryan Wilkins/ **81**

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HP offers site licensing for micro software

Major customers can get up to 75% discount

By Maura McEnaney

CUPERTINO, Calif. — Hewlett-Packard Co. last week became the first hardware vendor to announce a site licensing program for its microcomputer software.

Directed at major accounts, OEMs and educational customers who buy directly from HP, the program allows users to make up to 5,000 on-site copies of software programs at discounts of up to 75% of the per-copy list price.

"HP makes a fair amount of money selling software," said Bob Lefkowits, an analyst with Infocorp, a market research firm. A site licensing program is one way of supporting those customers, he said.

Through the program, HP's major customers will be able to add their current volume purchase discounts of up to 33% to the software volume discounts for a maximum discount of 75%, said John Orcutt, product marketing manager in HP's Personal Software division.

HP's major customers receive volume purchase discounts on all products based on the total purchase of HP equipment over the past year.

Five HP products included

The five products included in the program are HP's Executive Memomaker, Executive Card Manager, Advancelink, Graphics Gallery Collection and HP Access.

Site licensing prices will vary depending on both the number of program copies and a company's corporate discount rate, Orcutt said. For example, users buying between 50 and 99 copies of a software product will receive a 15% discount on the list price; discounts increase in increments up to 63% for users wanting more than 5,000 copies. When coupled with corporate volume purchase agreements, major account holders can receive a maximum discount of 75%. Users who are not a part of the program will still be able to buy an HP site license, Orcutt said.

HP will furnish licensees with a master disk for on-site duplication, a right-to-use license and disk labels printed with the customer name, product name and serial number. One set of documentation will be printed for every 10 users. Additional copies of the documentation will be extra.

Microrim, Inc.'s R:Base 5000 distributed with HP's Vectra and Touchscreen computers can also be purchased through the site licensing program, Orcutt said. Other vendors are expected to sign on.

Microcomputer software vendors have been considering site licenses for years, but few policies exist.

Last month, Ashton-Tate discontinued the site licensing policy on its newly acquired Multimate word processing packages while it formulated a program of its own.

Cullinet exec out in shuffle

From page 1

system. Chapman told *Computerworld* that he sees his primary role as making sure that Cullinet "remains in a competitive position and grows into a large company."

He said he was also concerned that Cullinet sustain "the spirit and teamwork" that has enabled it to make frequent product announcements as it pushes into the applications marketplace.

"Cullinet is moving aggressively into manufacturing applications, and clearly this guy understands manufacturing software," noted Steven Ossad, securities analyst for L. F. Rothschild, Unterberg Towbin.

The day after Chapman's appointment and Goldman's resignation, Cullinet officials briefed security analysts at the firm's Westwood headquarters. W. Christopher Mortenson, senior analyst at Alex Brown & Sons, Baltimore, said Chapman "came across well but had little of substance to say."

Mortonsen said he found it more significant that Cullinane told the group that the firm had decided the slowdown in software sales represented a long-term problem. Coping with it would require a different way of doing things at the company, Cullinane told the group, Mortenson said. After 21 consecutive quarters of growth in the 50% range, Cullinet's profits began to slip last summer, and for the nine months ending in January, profits were off by about one-third from the period a year earlier.

Departed exec Goldman

Chapman is a graduate of the Sloan School of Management at MIT; Goldman is a computer science graduate from Purdue University and one of the two programmers who 13 years ago took a B. F. Goodrich Co. system and adapted it into Cullinet's IDMS data base management system.

Ossad said Cullinet hurt its own credibility last year by saying it planned to ride out the slowdown in sales while continuing to invest large amounts of money in research and development. "Maybe Goldman was part of the problem," he said.

John J. Gawlinski, manager of data access systems at Shearson Lehman Brothers, Inc. in New York, said he hopes the change will bring greater emphasis on technical support expertise at Cullinet, which he said has "decreased significantly over the past five years."

In describing Cullinet's organization, Goldman summarized: "I reported to John Cullinane, and everyone else reported to me." With Chapman's appointment it became clear to Goldman that "I would be operating in a reduced capacity. That prompted my decision to resign," he added.

"Inevitably some of Bob's duties would have become less than what they had been," Cullinane told *Computerworld*. "He felt his career path was blocked."

Cullinane said, however, that Cullinet was looking for Chapman's breadth of experience rather than passing judgment on its former president.

The parting was "very friendly. We would have liked Bob to stay, but we knew he might not," Cullinane said.

Cullinane cited Chapman's experience with large companies such as IBM as the major reason for the appointment.

"Communicating to 1,800 people is different from communicating to 80," Cullinane said.

Goldman, 36, was one of the first 10 employees at Cullinet. He has supervised Cullinet's software development, headed technical operations, chaired the management committee, served as executive vice-president and in 1983 became president and chief operating officer.

Goldman said he used to have a sense of the job market from the calls of headhunters asking him to consider higher positions. Those calls stopped when he became president of Cullinet, since there were few positions higher than president of one of the largest independent software companies, he said.

After resigning, he said, "I hope the phone starts ringing again."

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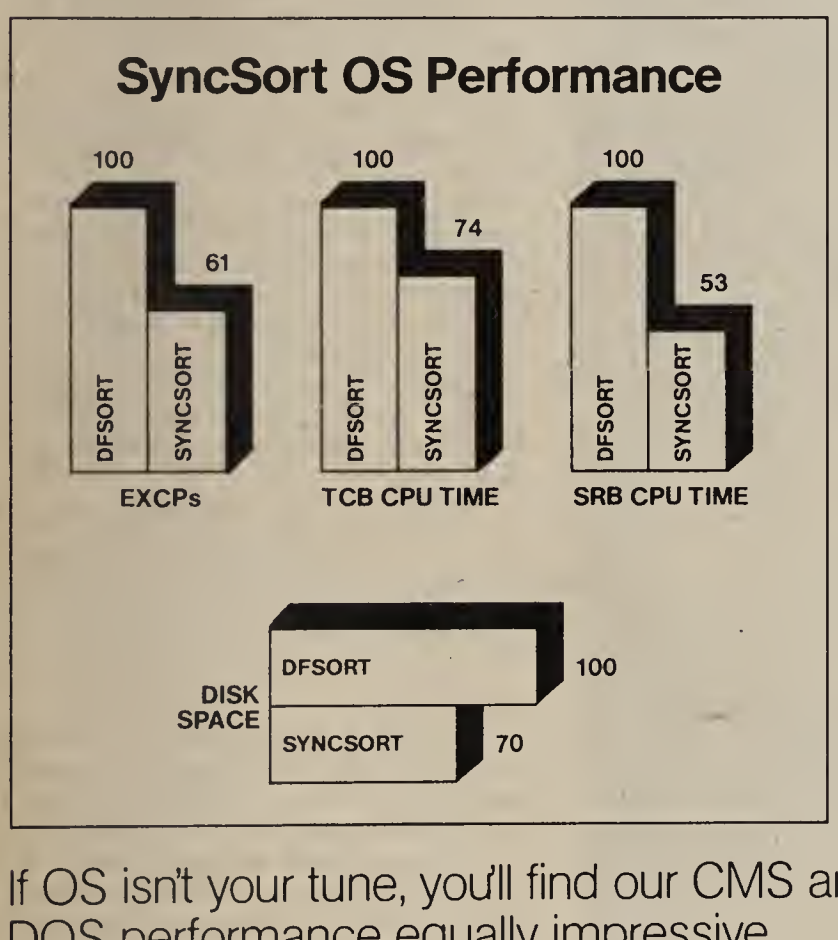

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NEWS

AI-based financial system allocates assets based on goals

Said to speed creation of comprehensive plans

By Douglas Barney

FORT LAUDERDALE, Fla. — In what is billed as the first commercial application of artificial intelligence technology for the financial services industry, First Financial Planner Services, Inc. (FFPS) last week announced Plan Power, an expert system that performs personal financial planning.

The system integrates the knowledge and analytical tools required to produce financial plans and to manage an independent planning practice, the firm said.

"One of the great hurdles in financial planning is the great amount of expertise and time that it takes to produce a comprehensive plan for a client. You can quickly reach the point where you cannot handle any more clients, and your growth is shut off. Plan Power dramatically compresses the amount of time it takes to produce a plan," said Warren Gedstad, vice-president of education and information services for FFPS.

Plan Power is based upon the newly introduced Xerox Corp. 1186 advanced artificial intelligence workstation that includes an 80M-byte hard disk, 1.2M-byte floppy disk drive and proprietary expert system software written in LISP. The Xerox 1186 also comes with the ability to emulate the IBM Personal Computer.

Plan Power is an investment-driven system that allocates a client's assets based on the client's goals. The system provides strategies for income tax planning, capital management, cash management, risk management and estate conversion over a five-year period. The system uses graphics symbols or icons to select functions, and data is entered in plain English.

The key to Plan Power is a built-in feature called the Expert Planner, which automates the planning process through a knowledge base of financial expertise. By manipulating this knowledge base, the system is able to reason logically, make recommendations and explain observations, the firm said.

Plan Power was developed by Cambridge, Mass.-based Applied Expert Systems. Travelers Corp., FFPS' parent company, owns a significant minority interest in Applied Expert Systems.

Engineers from Applied Expert Systems' Advisory Services developed the knowledge base through interviews with experts in financial planning.

Explains logic behind recommendations

As a result of these interviews, Plan Power contains more than 6,000 rules, called heuristics. Plan Power can also explain the logic behind its recommendations, and through its "what-if" capability, planners can test these recommendations against alternatives.

The system is available only to FFPS clients. The hardware is leased to clients for approximately $600 per month. The software and maintenance, however, is provided as part of the $15,000 annual charge for FFPS clients, who already receive a market development program, seminar package, telemarketing program and image development assistance.

Many of FFPS' clients do financial planning within major corporations through agreements between the planner and the major corporations.

Approximately 60 financial planning firms, representing 150 financial planners, will receive the system when deliveries begin next month.

Ansa move woos corporate users

From page 1

ages will speed acceptance.

The most recent sales estimates from Future Computing, Inc. in Dallas put specialty computer store sales of Paradox at about 10% those of Ashton-Tate Dbase products. The market research firm estimates November and December sales at 1,449 copies of Paradox against 13,156 copies of Dbase products. In January, Paradox sales perked up to 13.6% of Dbase sales, based on 813 copies of Paradox sold compared with 6,154 copies of Dbase.

"I'm sure [Ansa] is not ready to fold up shop, but they've got to be a little disappointed," said Bob Lefkowits, a consultant with Infocorp, a Cupertino, Calif.-based market research firm. "It's like trying to get people to convert from Cobol to Pascal."

Dow said Ansa is also examining micro-to-mainframe data base file exchange, which Boston-based Yankee Group analyst Michael Goulde called a critical next step. "There is a cloud hanging over the whole micro data base market, and that is the migration of mainframe data base management systems down to the micro, particularly the interface to IBM SQL that is lacking from products like Dbase and Paradox," Goulde said.

Ansa is one of the few software start-ups to get significant venture capital funding during dry days in the industry. The company obtained about $2 million in financing and a marketing campaign from venture capital firm Sevin Rosen Management Co. of New York, the high-profile group headed by Ben Rosen and a former employer of Dow.

Rosen, speaking at the 1986 Paine Webber Software and Services Conference in New York earlier this month, called Ansa "probably the second fastest starting software company — after Lotus Development Corp. — when all is said and done."

Dealer Corporate Software, Inc. ranks Paradox eighth in data base use, behind such veterans as Dbase; Dataease from Software Solutions, Inc.; Power-Base from Powerbase Systems, Inc.; R:Base 5000 from Microrim, Inc.; and PFS:File from Software Publishing Co.

"Because of the marketing campaign, there was a lot of curiosity out there, so sales were high for a new product," said Mary Ellen Powers, data base product manager for Corporate Software. "What I am hearing from people is they like Paradox but not enough to switch from Dbase."

The key change in the new Paradox version is the elimination of copy protection, a move taken in direct response to customers' complaints, Dow said. The restore/backup function sometimes failed because of the copy protection feature, and Ansa said it opted to "make it easier for the honest user." Now, users will not get technical support unless they register.

Release 1.1 of Paradox, which runs only on Microsoft Corp. MS-DOS systems, also reads files from upgraded versions of other programs released since Paradox's debut, features an application generator and runtime version and speeds the program's performance, according to Richard Gorman, manager of product marketing.

Paradox retains its $695 retail price, with free upgrades to customers registered as of March 17 and to any users who bought the program after Feb. 15, Gorman said. Other users will have to pay $19.95 to upgrade.

Ansa also fine-tuned the sorting algorithms in the product's virtual memory scheme to speed performance, Gorman added.

Under its major accounts program, Ansa still offers volume discounts only through its dealers but provides personal contact and support to corporations who want it.

A priority services plan was designed for companies with installed bases of 250 or more personal computers. The plan includes training and course materials, early evaluation copies of product enhancements and new products and centralized registration. Ansa is also offering an optional corporate liability limit for product misuse by employees.

The package's annual cost is $2,000 for companies with two MIS personnel who will deal with Ansa, $500 for each additional contact person and $1,500 for additional sites.

A select support program, intended for firms with between 50 and 250 personal computers, includes a technical support hot line, technical notes, advance product information, volume discounts and a limited liability option and costs $500 yearly.

Computerworld senior writer Douglas Barney contributed to this report.

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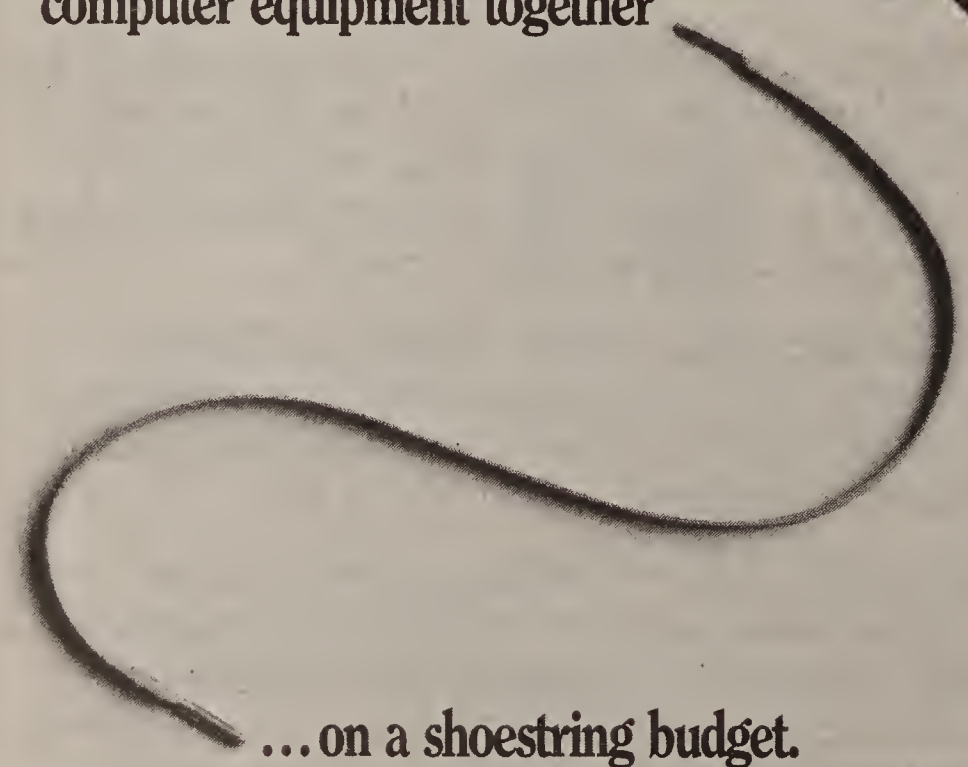

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NEWS

OTA urges federal agencies to improve systems management

Cites lack of attention to computer security

By Mitch Betts

WASHINGTON, D.C. — Federal agencies should improve the management and strategic planning of their information systems, increase the use of decision support systems and give more attention to improving computer security, according to a wide-ranging study of government information systems.

The study by the U.S. Congress' Office of Technology Assessment (OTA) released recently said that Congress and the executive agencies could use decision support systems to study alternative policy options, collect research data and display graphics.

The OTA urged the government to prepare more comprehensive five-year strategic plans for information technology, to reform the procurement process and to prepare for the changes in government information dissemination that result from technologies such as electronic mail and interactive data networks.

Failed to heed policy directives

This report, the latest in a series on federal information systems, said that federal agencies have failed to heed numerous reports and policy directives urging improvements in computer security.

An OTA survey found that approximately 40% of the agencies have not completed a security risk analysis in at least five years, 25% do not investigate personnel with access to sensitive systems and 60% do not have a contingency plan for system disruptions. Also, 75% of the agencies surveyed do not have an explicit security policy for microcomputers.

The study concluded that the lack of attention to security is caused by three factors:

- Competition for resources in federal programs, which limits spending for latent areas like security.
- Lack of awareness or motivation among government employees and managers.
- An absence of clear policy guidance.

The OTA endorsed congressional efforts to write a federal computer crime law covering interstate commerce. The office endorsed federal action because state laws cannot cover interstate crimes or computers that use data communications nets that routinely cross state lines.

The technology office, a support group for Congress, said the lawmakers could make greater use of computer technology to assist in policy development and in the oversight of executive branch agencies.

Furthermore, policymakers could take advantage of computer modeling techniques to improve the government's ability to analyze long-term trends and their implications for public policy, the study said.

Tiara Quickstart eases installation of local-area net

By Peggy Watt

MOUNTAIN VIEW, Calif. — Tiara Computer Systems, Inc. begins this month bundling Quickstart, an interface for easier installation of its Tiaralink local-area network, which is now Netbios compatible.

The new installation procedure is largely menu driven and places a shell around the network's features to enable a user with no programming or networking experience to implement the token passing-based local-area network quickly.

Standard configurations are already set but can be changed later, and peripheral support can be added as needed.

"No features are deleted; the choices just aren't all thrown out there to start," Tiara President Thomas Hong said.

The program comes on a single diskette, accompanies Lanware 1 and supports configurations for all of Tiaralink's features, including the maximum 255 users. It is free to all current registered users.

'Good tool for the retailers'

"This is a very good tool for the retailers to get themselves acquainted with local-area networks," he said. "We hope Quickstart will enable entry-level users and retailers to install the network with a limited number of steps." The company will offer retail training sessions to demonstrate Quickstart and Tiaralink.

Tiaralink itself is an upgraded reincarnation of Davong Multilink, developed by the now defunct Davong Systems, Inc., from which several of Tiara's officers came. Tiara first turned to Davong's former customers, which were seeking support, and considers Quickstart another step toward building its own customer base.

The company is also rebuilding its European contacts, and Hong said he hopes Quickstart will help the company "jump the hurdle" of language problems in the international market.

Burroughs network capability offers enhanced access to SNA

By James Connolly and Elisabeth Horwitt

DETROIT — Extending its mainframe communications capabilities, Burroughs Corp. last week announced products providing greater access to IBM's Systems Network Architecture and support for several hundred additional connections in a distributed processing network.

The announcement included the Ethernet-based CPLAN, a mainframe-based central net management facility, and CP 2000, a communications processor that provides expanded network management. The CP 2000 supports Burroughs Network Architecture (BNA) and provides an SNA gateway. It will serve as a building block for Burroughs communications developments.

Burroughs previously provided some basic SNA connections, such as IBM's RJE and 3270 communications. The SNA gateways announced last week will provide seven 64K bit/sec. circuits, instead of one, and greater opportunities to customize networks for customers, said Armond Newton, Burroughs' program general manager for communications. He added that Burroughs intends to add support for IBM's LU6.2 protocol by early 1987.

"Today's announcement is the beginning of a new era in communications and coexistence for Burroughs. Burroughs recognizes the need to coexist in other networks within the industry, like IBM's SNA," said Fred R. Meier, Burroughs vice-president for corporate program management.

According to Newton, the CP 2000 operates as a front-end processor for a Burroughs host or as a remote controller and concentrator. It runs BNA Network Services Software, which provides control of terminal networks and gateways to other net architectures like SNA and X.25.

The CP 2000 connects with its Burroughs hosts through Burroughs CPLAN, an Ethernet local-area network operating at 10M bit/sec. with coaxial cable. According to William Brown, BNA and coexistence product program manager, "The outbound side of CP 2000 will eventually link Burroughs systems to other Ethernet environments," such as Digital Equipment Corp.'s Decnet. CPLAN supports one host and up to 25 front-end processors in one version or multiple hosts in a 100-connection second version.

Burroughs Network Control Facility, priced at $350 per month, is a network management software package that runs on any Burroughs mainframe model.

Newton claimed that networks using Burroughs' previous communications processor, the CP 9585, supported "hundreds" of connections, while networks using the CP 2000 will support "thousands."

Tony Bachman, administrator of information services for the city of Columbus, Ohio, and a director of Burroughs user group Cube, said he foresees no immediate need to add any of the new releases to the city's current Burroughs installation. "We have about 700 CRTs and 150 printers, all linked to four Burroughs mainframes. We don't need to hook into IBM." He added that his department uses a CP 3680 front-end processor, which can handle up to 10,000 nodes.

Nor does Bachman see a future need to install an Ethernet connection: "We currently run at 9.6K bit/sec. We will probably go up to 19.2K in the next two years, but there is no need for 10M bit/sec. data rates."

The CP 2000 will be available in July for use with Burroughs' A series, B5900, B6900 and B7900 mainframes. Prices for the CP 2000 range from $35,000 to $55,000.

Novell to release Netware 2

Netbios compatibility integrated into system

By Elisabeth Horwitt

OREM, Utah — Novell, Inc. today is expected to make commercially available Netware 2, the Netbios-compatible version of its Netware software for IBM Personal Computer local-area networks. Earlier in the month, Novell announced the Netware/SNA Gateway, a 3270 terminal emulation product that allows IBM PCs on Netware networks to access IBM mainframes.

"With Netware 2 we have made Netbios compatibility an integral part of the operating system for the first time," said David McMurray, Novell's manager of communications products. "With Netware 1.02, you had to load Netbios in as a separate program."

Novell has signed an agreement to become a reseller of Netware/SNA Gateway, which is manufactured by National Advanced Systems Corp. (NAS). The gateway, which runs on a nondedicated IBM PC, appears to the IBM host as a 3274 Model 51C/61C remote communications controller. It can communicate with the host over dial-up or leased lines at speeds up to 9.6K bit/sec., according to NAS. A faster version is scheduled to be coming out in the next six months, although Novell has made no firm commitment to purchase it.

IBM PCs on the network appear as 3278 Model 2s. Users can hot-key between host and local IBM PC-DOS sessions. The Netware/SNA Gateway costs $5,530 for up to eight sessions, $6,095 for up to 16 sessions and $7,495 for up to 32 sessions.

According to Terence Bentley, senior analyst at Boston research company the Yankee Group, Novell's new interest in gateways is part of its strategy to keep ahead of competitors like 3Com Corp. and Proteon, Inc. "Novell has stayed on top because the others were busy designing hardware," Bentley said. "But within the next four or five weeks, users should be able to buy 3Com's 3+, a networking software package that directly targets Netware."

Instead of buying 3Com hardware and then installing Novell software, users will be able to get "the whole shebang" from 3Com, Bentley said. "Novell is trying to be a one-stop vendor, but it should watch out for competitors trying to do the same thing by moving into an area that has always been dominated by Novell."

McMurray said that Novell plans to be "compatible with a range of bridges and networks. We're moving into a time when that is important to users." He added that, through its dealers, Novell learned of other vendors' gateways that worked with Netware. "Some customers demanded that a gateway be part of the contract. If it turns out that SNA gateways from Pathway Designs or Gateway Communications can be used with Netware, we're pleased."

With the Netware/SNA Gateway, however, Novell has taken a more active role in providing gateways to its customers, McMurray said. Novell is testing the Netware compatibility of Systems Network Architecture gateways and 3270 emulation boards from Pathway Design, Inc. and IBM. IBM's gateway reportedly worked on Netware 1.02 but not on Version 2.

"We don't want customers to think the NAS product is all we support," McMurray said. Novell plans to release by the end of this month an asynchronous communications server from Network Products Corp. priced at approximately $1,490.

TOP OF THE NEWS

NEWS from page 1

um arsenide chip technology and is on schedule for 1988 or 1989 delivery, Carlson said.

■

Prime Computer will look to reduced instruction set computers and parallel architecture in future special-purpose systems, according to Stephen Kiely, vice-president of systems marketing and development at Prime. He added that RISC technology is likely to be incorporated into computer-aided design workstations in the second half of 1986. Also, two- to four-processor parallel architecture is under consideration but not imminent, he said.

■

Steve Crummey, Lotus Development's vice-president of sales and services, recently confirmed Lotus' plans to introduce word processing and data base software packages in 1987.

■

Unix Trial Use Standard 1003 was approved by the IEEE Standards Committee last Thursday, defining a standard Unix interface for C language source code that will lead to greater porting of Unix applications, said Jim Isaak, committee chairman and product marketing director at Charles River Data Sytems, Inc.

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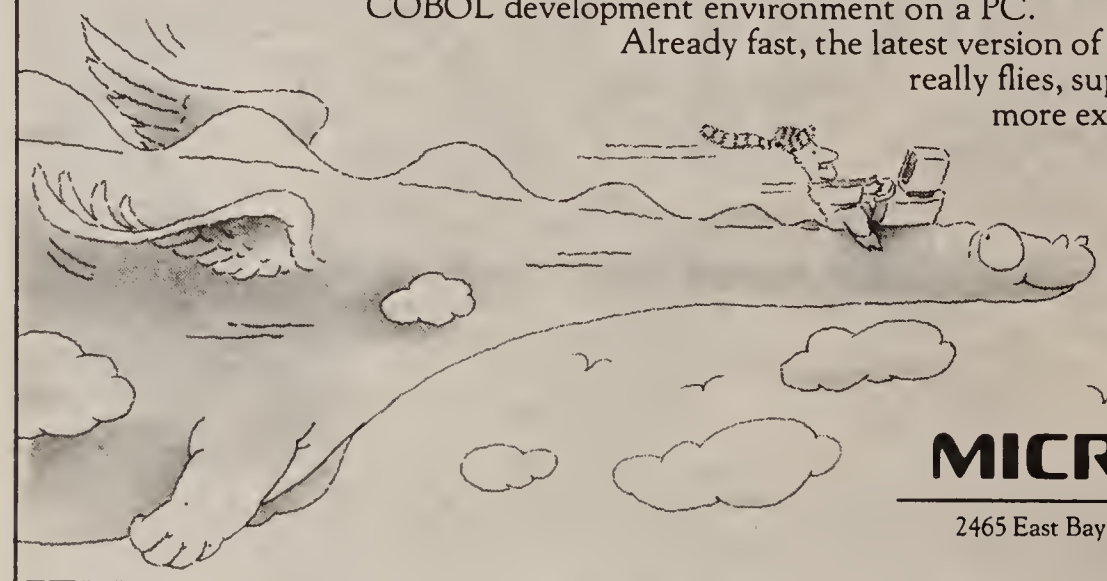

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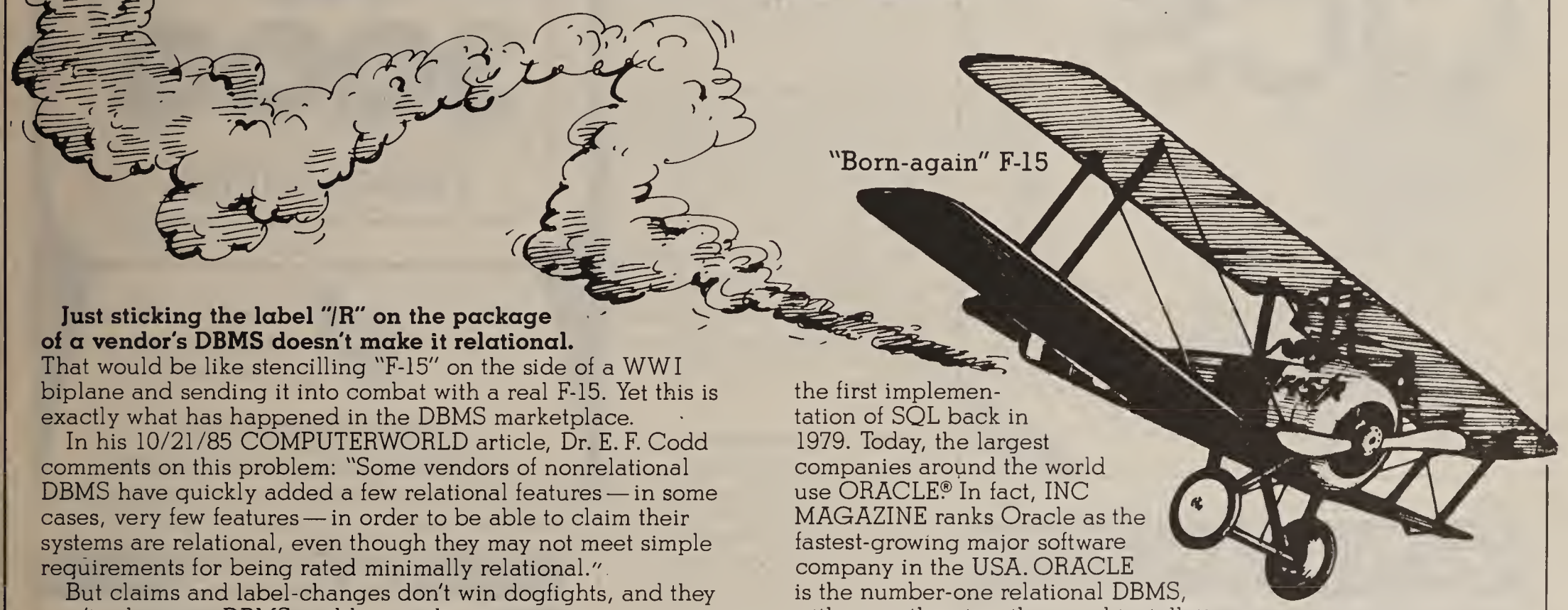

"Born-again" F-15

Just sticking the label "/R" on the package of a vendor's DBMS doesn't make it relational. That would be like stencilling "F-15" on the side of a WWI biplane and sending it into combat with a real F-15. Yet this is exactly what has happened in the DBMS marketplace.

In his 10/21/85 COMPUTERWORLD article, Dr. E. F. Codd comments on this problem: "Some vendors of nonrelational DBMS have quickly added a few relational features — in some cases, very few features — in order to be able to claim their systems are relational, even though they may not meet simple requirements for being rated minimally relational."

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NEWS

High-tech sting nets seven teens in nationwide hacker ring

As many as 15 systems tapped

By Jeffry Beeler

FREMONT, Calif. — A Silicon Valley high-technology firm ranks among the hardest hit victims of a recently arrested hacker ring that stands accused of breaking into roughly a dozen corporate, government and university mainframes.

The unidentified vendor reportedly expects to spend $5,000 to $10,000 to restore its compromised data integrity and security, which local teenagers repeatedly bypassed with the help of stolen phone numbers and access codes.

"I don't have a lot of specifics about how the company's system was damaged," according to Sgt. Dan Pasquale of the San Francisco community of Fremont's police department. "But I do know the breach forced the firm to change its 800 numbers, report the changes to its customers and purge its system" of any extraneous information that the intruders may have added.

Phony bulletin board as bait

The vendor was only one of 10 to 15 institutional targets of a nationwide hacker network that local police uncovered by using a phony electronic bulletin board as bait. Devised and run by Pasquale, the electronic bulletin board formed the centerpiece of what is widely believed to be the first high-tech sting operation of its kind in U.S. law enforcement history.

"In 1984, another law enforcement agency elsewhere in California established a similar electronic bulletin board strictly for intelligence purposes," Pasquale said. "But after operating for only about two and a half months, the bulletin board was shut down without producing any arrests."

Pasquale's undercover investigation netted seven suspects, none older than 18. The youths, all of whom live on the fringes of Silicon Valley, were arrested on March 5 and charged with possession of stolen property and trafficking in unauthorized credit card numbers and long-distance service codes.

Pasquale's sting operation also yielded evidence of other "phone phreaking" and illegal hacking activities elsewhere in the U.S. The evidence has already been forwarded to the appropriate local or federal law enforcement agencies, which are expected to make additional arrests soon.

The roots of the latest police crackdown on youthful microcomputer buffs go back to last year when a local teenager was nabbed for using stolen credit card numbers that he had obtained from an underground bulletin board.

With the 16-year-old boy's cooperation, police launched a preliminary investigation to find out whether the electronic bulletin board was being used to commit other crimes.

Drastic countermeasures

The police's inquiries quickly persuaded them that misuse of the facility was so widespread that they would have to take drastic countermeasures. Posted on the bulletin board were purloined service codes and phone numbers that allowed hackers to place an unlimited number of long-distance calls and have the charges billed to someone else's account.

"During our investigation, we stumbled upon a long-distance carrier that in this immediate area alone had been hit with $30,000 in unbillable charges per quarter," Pasquale said.

To catch the suspects, Pasquale created his own seemingly authentic underground bulletin board and assumed the false identity of a hacker nicknamed "The Revenger." He then baited his electronic trap with some systems passwords and account numbers, most of them valid, and waited for his unsuspecting prey to strike.

Before long, the ploy had resulted in seven local arrests. Pasquale, who shares his victims' interest in computing, was able to trace the suspects' names and addresses through the phone numbers and other identifying information they had to provide before they could log on to his system.

Most of the systems violators that Pasquale encountered during his sting operation illicitly obtained their access and service codes "basically by hacking them out," he said.

One of his suspects, for example, wrote a program that "constantly attacked a long-distance carrier's access port and recorded every successful attempt to obtain an account number. He let the program run all night, and when he got up the next morning, he had a long list of codes."

"The majority of the kids who came to our attention just wanted to get into a system, look around and let someone know they had been there when they were done," he said. "Only a few wanted to cause damage on purpose."

But even hackers who are motivated solely by curiosity and a desire for recognition can seriously undercut an organization's data security. "Kids often post a system's access code when they finally get tired of using it," Pasquale said.

"Once a code becomes public and falls into the hands of many people, you start running the risk of real problems," he added.

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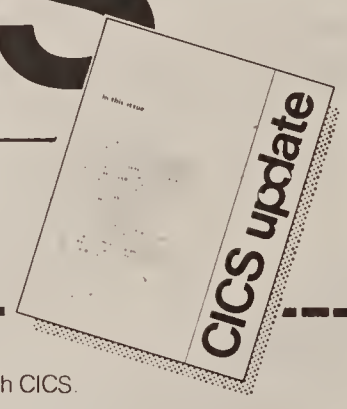

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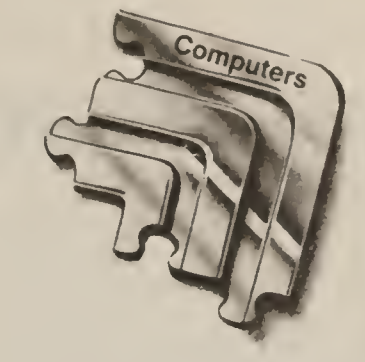

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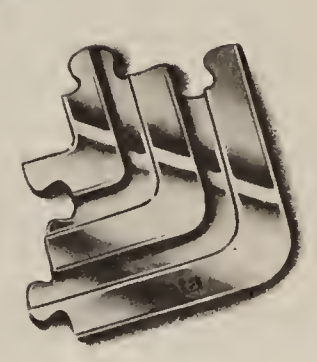

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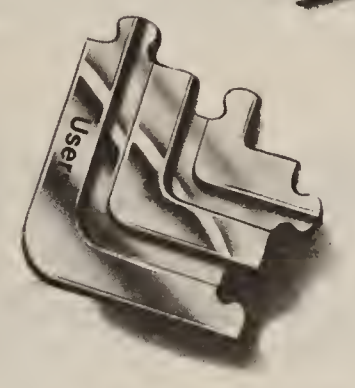

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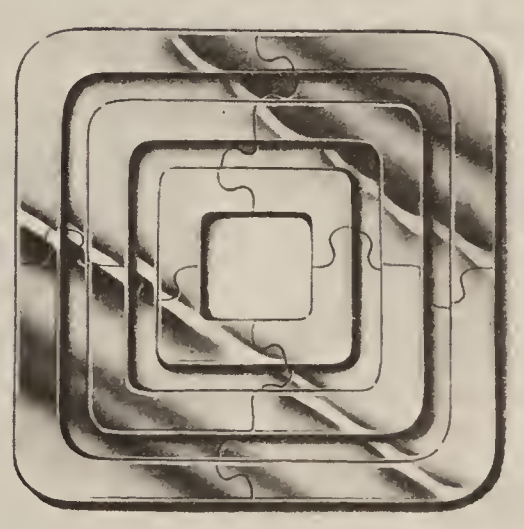

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California Steel molds MIS

From page 1

together a joint venture with Kawasaki Steel of Japan and Rio Doce, Ltd. of Brazil, creating a new steel company that receives raw steel slabs from its Brazilian partner and production and technological expertise from the world's leading steel maker. As owner of five steel-intensive manufacturing companies that make wheel rims, fire hydrants and steel pipes, Wilkinson is California Steel's biggest customer.

After acquiring California Steel, one of Wilkinson's first decisions as chairman was to cancel leases on the company's IBM 4341 and 3031 mainframes. "I looked at a room full of stuff and knew we certainly weren't going to plug into the monsters that Kaiser had," he told *Computerworld*.

"Wilkinson never really dealt with data processing at all, and a $50,000 a month lease on a machine scared him," recalls Don Kendrew, California Steel's manager of computer services. A former data base administrator and 10-year Kaiser veteran, Kendrew was recruited at the outset by California Steel's new management, many of whom were also Kaiser veterans themselves.

Steel production was set to begin in November 1984. But without computerized sales lists, mill schedules and inventory control systems, manufacturing would have been virtually impossible. The company needed a fast solution.

It was only after materials manager Steven Ipson demonstrated the capabilities of a microcomputer that Wilkinson found his answer. "He still had a simplistic attitude toward computers and decided to get more PCs," Kendrew notes.

Although a consulting firm recommended that California Steel immediately install a System/38, the initial investment and the time needed to get the minicomputer running were prohibitive. "If we bought a System/38, there was no way to bring the system up by November," Kendrew says.

Difficult to throw out

Using micros to build California Steel's new MIS department almost from scratch would be tough, Kendrew said, particularly since most of the systems that he was familiar with were designed for mainframe batch applications. "It's difficult when you get that tied to a batch system to throw it all out," he says.

California Steel's production systems were written using Ashton-Tate's Dbase III. Kendrew selected the product because of his success using an earlier version to write PC-based applications while still at Kaiser. "You can develop a program tremendously fast with Dbase. What might take a week to write . . . in standard high-level programming languages, you could write in a day using Dbase III," he says.

The new MIS department, consisting of Kendrew and three other former Kaiser colleagues who together had more than 50 years experience in the steel and data processing businesses, did a "weekend analysis" to come up with a list of software programs needed to run the new company. Once it decided upon those systems, the group wrote between 400 and 500 new programs for the micros. Some — like the production schedules for the company's plate mill — were completed just days before the plate mill began its operations.

This new approach to systems development was a welcome one for Kendrew, who no longer had to work with 20-year-old mainframe programs mired with spaghetti code. "We threw out the systems that had changed over time. Twenty years of maintenance was part of the problem. If you totally rewrite a program, it's much easier to run," he says.

Borrowing on some strict programming techniques learned at Kaiser, Kendrew says, "We tried to take what was good in the old system and implement it on the PCs." Today, the PCs serve as dedicated machines keeping track of inventory such as the slabs of steel delivered to the plant for processing. Other PCs are departmental machines used for word processing and departmental budgets.

The PC-based systems are even more effective than some of the older software systems, Kendrew says. An inventory system rewritten on the PC AT used a new identification system to improve dramatically the steel slab inventory. "In 40 years Kaiser never had a perfect inventory," Kendrew remembers. "It was inaccurate. Sometimes, it was more than 50,000 tons off." However, under the PC-based inventory system, "our first two physical inventories matched up down to the last slab," Kendrew recalls.

However, as the company's shipments increased to 67,718 tons of steel in January — the plant's capacity is 2.5 million tons of rolled steel, and California Steel's goal is to produce 900,000 tons this year — the company's update files and production schedules were taking longer and longer to produce.

"We're struggling with tons of data," says Ken Reid, California Steel's executive vice-president. "Our production reports are huge volumes, and they have to be produced every day." Files detailing manufacturing processes include more than 400,000 records and take up more than 15M bytes of storage, according to Kendrew, who has grown more and more fearful of losing data as the records grow larger.

"Our concern now is that we've reached the processing limits of the personal computers. . . . Those machines are running 6½ days a week. Some haven't been turned off in months," Kendrew says.

'We were limping along'

It was almost a year before Kendrew started pushing for another solution. "The way things were going, we were limping along. Although the PC was the only solution we could have come up with to start the company in that period of time, we also should have come up with a process of dealing with a System/38 a little faster," he says.

Currently, California Steel is converting some old Kaiser mainframe software programs that were never put on the ATs onto the System/38. Slowly, the crucial production applications will be rewritten to run on the System/38. The entire conversion will continue over the next few months, leaving the micros for departmental use.

Terminal emulation capabilities now being installed on about seven of the ATs will eventually give users like materials manager Ipson access to production data for their own analysis, Kendrew says. Right now there are no plans to network the micros, at least until IBM comes up with a solution to tie its Token-Ring network into the System/36, he says.

If growth continues at the resurrected steel mill, will California Steel ever have a need for mainframes in the MIS building now storing old furniture?

"I don't think we'll go back to mainframes," Kendrew says. "We may get into a multiple 38 environment someday, and as the microcomputer becomes more powerful, we may start to distribute more processing to them in a different way."

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Citibank set to install 168-processor Teradata relational data base system

By James Connolly

NEW YORK — Asking what applications his company will use with a 168-processor relational data base system is like asking the first Winchester disk user what applications he planned to run, says Citibank N.A.'s Michael Cappi.

What is important, Cappi notes, is not the application running on the adjacent mainframe but the amount of data that can be stored and readily accessed through the data base machine.

In an agreement announced recently, Citibank ordered a 168-processor system from Teradata Corp. When completed later this year, the installation will be the largest configuration to date for Teradata's DBC/1012.

Cappi, vice-president for Citibank's Systems and Technologies Division, declined to say which specific applications will access the data base and said that the data itself will be general bank and customer records. The bank has used a 16-processor Teradata system for the past two years.

"The reason the machine is so large is that the data base is so large. What we intend to put on the machine is a very large number of files. What is good about it is that the time it takes for a query to go against 168 processors is the same as the time it takes for one processor," according to Cappi.

In the Teradata approach, an IBM mainframe sends an IBM SQL query to the DBC/1012 via a block multiplexer channel. Within the DBC/1012, interface processors send the request over Teradata's Ynet to individual Intel Corp. 80286 processors.

COS opposes 50% budget cut proposed for NBS institute

By Mitch Betts

WASHINGTON, D.C. — The newly formed Corporation for Open Systems (COS) told a congressional panel last week that it has no intention of taking over the computer standards work of the National Bureau of Standards (NBS), as suggested by the Reagan administration.

David Martin, a COS board member, stressed that the role of the private-sector consortium is to accelerate the introduction of products using an open network architecture and not to supplant the NBS role as a standards body that performs basic research and testing of networking systems. Martin is president of National Advanced Systems Corp.

COS joined with the Computer and Communications Industry Association (CCIA) and the Computer and Business Equipment Manufacturers Association to denounce the 50% budget cut proposed for the NBS Institute for Computer Sciences and Technology [CW, March 10]. They said the institute is needed as a "neutral broker" for developing industrywide standards.

The industry groups argued that cutting the institute's budget from approximately $10 million to $5 million would jeopardize important computer standards work that enhances the competitive posture of U.S. firms in world markets.

The statements were made at a hearing on the NBS budget held by the U.S. House of Representatives' Subcommittee on Science, Research and Technology, chaired by Rep. Doug Walgren (D-Pa.).

In an apparent jab at IBM, CCIA President A. G. W. Biddle testified that industrywide standards for networking architecture are also needed to break Big Blue's near-monopoly share of the domestic market: "The industry's dominant firm is close to imposing de facto standards upon the user community, serving only to further entrench its position in the marketplace."

Biddle further testified that Japan, West Germany and other countries have aggressive government-financed DP standards programs because they recognize the role of standards in making their products more competitive. He cited the recently formed European Conformance Testing Service for Information Technology and Telecommunications [CW, March 10] as an example.

"If we were sitting today in a hearing room of the Japanese Diet [legislature], I do not think we would be arguing for the fourth or fifth straight year about cutting our efforts in computer science in half," Walgren said.

Tandem code generator debuts

May boost programmer productivity by 100%

By Jeffry Beeler

CUPERTINO, Calif. — Offering improved screen and interface development tools, Tandem Computers, Inc. plans today to release Pathmaker, an automated code generator that reportedly boosts programming productivity by as much as 100%.

Much of the claimed increase in development speed stems from Pathmaker's ability to automate the creation of user interfaces and screens for the vendor's Nonstop processor family. "Our customers have repeatedly told us that developing screens and user interfaces is the hardest part of programming, much harder than doing the back-end, data base part of an application," said Tandem product manager Gilbert Wai.

In the past, programmers of Tandem systems developed terminal screens by coding the underlying procedural logic manually. But with Pathmaker, the same screens can be "painted" with an interactive editor and then turned into finished Cobol source code automatically, Wai said.

Pathmaker also improves programmer productivity by incorporating several other enhancements:

- An applications prototyping capability.
- A library of prewritten data base functions that can reportedly be inserted automatically into applications to minimize coding.
- A central applications catalog that resides in Tandem's relational data base management system and automatically stores information like screen lists and Help libraries.

To help in developing specialized data base functions, Pathmaker supports Cobol 85, the Tandem compiler and runtime library that is said to be fully compatible with the latest Cobol standard [CW, Feb. 17].

Another feature that reportedly aids programmer productivity is the application generator's ability to add automatically the pointers that denote the beginning and end of each transaction, Wai said. This capability, previously done manually, is a prerequisite for "checkpointing," a Tandem technique that protects data integrity when a system fails in mid-transaction.

Together, Pathmaker's productivity-enhancing features minimize the number of Tandem-specific coding skills that programmers need to write applications that exploit the purported benefits of the company's proprietary architecture.

For the firm's low-end EXT systems, Pathway is available for a $3,500 initial license fee. For Nonstop II or TXP processors, the initial license fee is $7,500. First shipments of the automated application generator begin during the third quarter.

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Repair of bug in Computer Associates tool hikes CICS bills

Release 5 charges users for transaction wait time

By Eddy Goldberg

A large company in the Midwest switched from Release 3.2 to Release 5 of CA-JARS/CICS, a job accounting reporting system from Computer Associates International, Inc. Shortly after, the company's DP department began receiving complaints from corporate users who wanted to know why their bills had skyrocketed.

The Midwest firm used the product to charge back CICS transactions to its IBM mainframe users. Almost immediately after implementing the newer release, complaints began coming in that bills had dramatically increased from the previous month, in some cases as much as 500%.

Officials at Computer Associates confirmed last week that during revision of the product for Release 5, an error was discovered in Release 3.2 that affected the way CPU time was tracked during transactions. When the bug was corrected in Release 5, CPU time that had been allocated to system overhead was now included in the user's bill.

This problem reportedly shows up only when running IBM's DL/1 under CICS. Under DL/1, when running multiple jobs, there is a "wait" state during a transaction, Computer Associates said. Release 3.2 allocated that time to system overhead. The release includes that wait time on the application and bills it to the user.

Jim Petersen, team leader for JARS/CICS products at Computer Associates, said a possible flaw was found while developing the release, but it did not manifest itself in alpha or beta testing. Those tests included computers using DL/1 but in an IMS environment where the product worked satisfactorily, he said.

Ray Brow, assistant vice-president of development at Computer Associates, is responsible for job accounting products. "There was a bug in the product," he acknowledged. "As soon as we found the error, we debugged it and documented it. We've written an informational paper that goes to all our customers warning them about it."

> ***'There was a bug in the product. As soon as we found the error, we debugged it and documented it.'***
>
> — Ray Brow
> Computer Associates International, Inc.

Some customers have already received the paper, and others will receive it shortly. The information is also available on the company's dial-in CA-Uniservice, which informs customers of the circumstances under which the problem occurs and how to adjust their billing algorithms.

Brow confirmed that the problem was isolated to the minority of CA-JARS/CICS users who do their tracking and billing with DL/1. He was unable to divulge the number of such users. However, he said that the product is flexible enough to allow customers to adjust the Release 5 to come out with the same numbers as on 3.2.

The Midwest-based DL/1 user said he followed the suggestions from the company on how to adjust the bills. "I tried to write some exits, but I could not do it." Brow claimed the customer is refusing to implement the solution.

The customer said his biggest problem is that DL/1 is not consistent as to when and how often it will go into its wait states and that one transaction might have 100 waits. He said he is still unable to adjust the billing to recreate the numbers from release 3.2. Brow acknowledged that the adjusted numbers will not be entirely consistent but that they can still be within budget.

The DP customer said that charging users for wait states is valid; therefore, his billing has been inaccurate for the past five years, with much lower numbers for CPU users than was actually true. However, he is not using Release 5, although it is accurate where 3.2 was not.

"We've backed off to 3.2 because all our customers are on yearly budgets. We'd blow those yearly budgets in two or three months. We can't even juggle our paper money. What about a service bureau using the product and billing in real money?"

A DP employee at a time-sharing company that uses Release 4.2 of the product, but under MVS and DOS, said he does not think wait time should be charged. "It would upset the clients," he said, adding that the overhead time can be eliminated through an option.

Credibility with users has been hurt

The DL/1 user said that now his credibility with the users has been hurt. After all, he said, if he was wrong for five years, why should users believe him now? He said he is especially upset because he was not warned of the changes when he got the release. The tests of Release 5 that he did in his shop came out the same as with 3.2 because no wait states were invoked.

Brow acknowledged that it has created a sticky situation. "The customer is upset, understandably so."

As for the future, the disgruntled user said he does not know what to do and is in a wait state of his own.

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Burroughs in drive dispute

From page 1

Burroughs notified some users and third-party dealers of its 402M-byte disk drive — sold since 1978 as the B9494-41 and commonly referred to as the 207 — that the disk drive unit will be ineligible for maintenance unless users meet various restrictive criteria.

Contains caveats, exceptions

Not all 207 users have received the letter, which contains caveats and exceptions; the prerequisites for continued maintenance include high serial numbers and keeping the drives at their current locations. Burroughs officials were unable to provide details about how many disk drives will be decertified under the new policy. The company warned users that if the drives are moved, they must be moved under strict packing guidelines, and even then, it may cost the user $3,500 to replace each of the two data modules before Burroughs will certify the drives for maintenance.

The policy change caught users by surprise and will be a prime topic for discussion when the Burroughs users group Cube meets in Anaheim, Calif., next week, according to Tom Hind, chairman of the Cube large systems resolutions committee.

"As of the first of the year, a lot of people had a certain number of recoverable dollars they could count on. In February, all of a sudden, they have nothing," Hind said. He noted that his own company, Spartan Mills of Spartanburg, S.C., where he is a systems programmer, has been considering buying used 207s for branch DP centers. But the Burroughs policy change complicates that plan, and the change could keep Spartan Mills from moving 207s from one data center to another.

Installed base as much as 12,000

One observer estimated the installed base for the 207 at 10,000 to 12,000 drives. Several users and dealers interviewed about the policy change asked that they remain anonymous.

Estimates of a 207's value before the change varied, with one dealer quoting a value of $8,000 to $10,000. "But now it is boat anchor time for these," that dealer said.

Several users complained that the 207's two data modules are subject to damage in transportation, even if packed and shipped according to Burroughs' specifications. "I could have gotten $7,000 for my 207s before. Now if someone is interested in buying them, they know they will have to pay $3,500 per data module, so the market price has dropped considerably," a user said.

Seeking financial allowances

Some of those users said that any discussions they have with Burroughs about replacing 207s will include user requests that Burroughs make financial allowances for the reduced value in 207s. They also speculated that Burroughs may be decertifying the 207 to force users to buy the B9494-5, a thin-film head drive manufactured by Burroughs' Memorex Corp. subsidiary.

There was concern that the high-density, thin-film drive may be too large for some mid-range systems users and that some users in the Burroughs community prefer the multiple data paths of the 207, which Burroughs stopped marketing actively less than two years ago.

Hind said he was surprised by the speed with which Burroughs decertified the 207. "It's not within the time frame where a company normally would drop off something like that," Hind said.

Will not encourage third-party sales

Another user said he was surprised to see the decertification move because four years ago Burroughs officials claimed that they would encourage third-party sales and that this latest move appeared in conflict with that claim.

However, while users were concerned about losing value in 207s or buying 207s, there was no consensus about the merits of that drive.

One user in the educational community noted, "Nothing could be worse than the 207. It was a dog."

Another user commented, "Users were split on its ability. Maybe it had to do with their local environment or their local service people. The 207 had periods of very good reliability and stability and periods where it was not so good."

Southwestern Bell launches ISDN trial

WASHINGTON, D.C. — Southwestern Bell Telephone Co. recently announced it will conduct an internal trial of the Integrated Services Digital Network (ISDN) technology. The trial will begin in early 1987 at company headquarters in St. Louis.

At a press conference, company officials added that three large business customers are planning to sign agreements in the next two or three months to become early users of the technology, beginning in 1988. Officials did not divulge the names of the three customers.

The first phase of the internal trial will test the performance of AT&T Technologies and Northern Telecom, Inc. switches and the transmission channels for voice and digital data, officials said.

A second phase, beginning in the second half of 1987, will test the application of ISDN technology to packet-switching networks, private lines and local-area networks, according to officials.

These trials will be supported by Bell Communications Research Corp., and the results will be shared with other divested Bell operating companies.

— Mitch Betts

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VIEWPOINT

EDITORIAL

Voice and data: Bridging the gap

Integration of voice and data communications is a hot topic these days among users and vendors and around the conference/trade show circuit. Local- and wide-area networks, T1, LU6.2 — the pitch is getting fevered.

Senior MIS/DP personnel find themselves at the center of these developments. Acting on general management mandates, end-user demands and/or their own interests in efficient operation, many MIS/DP managers suddenly find themselves in the telecommunications business. It has not always been a happy transition.

While computer managers in medium-size and large corporations recognize the desirability of having telecommunications and DP working side by side, they also realize that differences between the two involve far more than technology. As explored in this week's Executive Report on voice and data integration, the two have traditionally been separate but unequal in the corporate world. It will now take more than an edict from the chief executive officer to bring them together under one organizational umbrella.

Begin with the perceptions of status and relative contribution within the corporation. Until divestiture highlighted the potential impact of telecommunications on business, the telecommunications group in most corporations was viewed as little more than a bunch of electricians — telephone movers who hung out in closets, poked under desks and couldn't get rid of static. MIS/DP, meanwhile, was made up of "glass-room" bureaucrats who would make you wait three years if you asked what time it was.

The new reality is that the two disciplines are integrating, and it is MIS/DP that has the upper organizational hand. This is due to the simple fact that information processing is more important and pervasive in most corporations and telecommunications must serve data transmission needs — not, by any means, vice versa.

Reality or not, this situation should not serve to let MIS/DP off the hook. Past experience indicates that these professionals can be excessively cautious, territorial and resistant to change. MIS/DP has, for example, traditionally thought only in terms of dedicated point-to-point data networks such as IBM's Systems Network Architecture and is more than a little reluctant to consider the cost-effective telecommunications options of packet switching or circuit switching. Those would, after all, entail some power-sharing, and power-sharing has not always been an MIS/DP strength.

This must now change, and strong MIS/DP leadership will change it. Already, enlightened computer managers have successfully brought voice and data personnel together with innovative cross-training programs and effective long-term planning. Practical, hands-on corporate blueprints must become the bible for the merger or the turf battle, and infighting will overwhelm any effort to bring the two into step.

Technological panaceas such as Integrated Services Digital Network will not suddenly ride over the horizon and save the day. Those who await such solutions to bridge the gap are destined to be disappointed.

The answer, rather, is skillful management. People-to-people effectiveness. Nothing more, nothing less.

LETTERS TO THE EDITOR

Software AG chairman has pie-in-sky hopes for Adabas, Natural products

By saying that Software AG of North America, Inc. never claimed Adabas was relational in the article, "Industry leader speaks out" [CW, Feb. 10], Software AG Chairman John Maguire apparently overlooked the many advertisements in *Computerworld* and other publications over the last year or so, not to mention his company's own 1985 annual report, which describe Adabas as "one of the world's most widely used relational data base management systems."

Adabas is an excellent network data base management system: powerful and well supported with high performance. It is not relational by any stretch of the imagination — even a sales representative's imagination. Calling it that doesn't make it so. I'll bet that Software AG is not attempting to rename their product Adabas/R in order to spare itself the wrath of Codd.

Adabas does not go beyond E. F. Codd's rules either. A properly normalized data base has no need for Adabas' periodic groups or multiple value fields, and its method of storing such data does not impose the artificial limits that Adabas does.

Of course, Adabas files can be normalized into flat tables, too, but there is no easy way to join data elements.

In any case, an attempt to do this in a company of any size will run right up against Adabas' attempt to compete with the new, next-generation DBMS such as IBM's SQL/DS and DB2 and Oracle Corp.'s Oracle.

I know firsthand, however, both Adabas and the difficulties of a full SQL implementation; a clean SQL "graft on" to Adabas would be a formidable development project.

It will be interesting to see how it is done and how close to the proposed ANSI standard the end result is.

Chris Wooldridge
Product manager
Oracle Corp.
Menlo Park, Calif.

■

I read with great interest the interview with Software AG of North America, Inc. Chairman John Maguire in the article "Industry leader speaks out."

Like so many vendors that have chosen to create a new language, Maguire's prediction of the death of Cobol was to be expected, even if it cannot be accepted.

It is undoubtedly safe to say that Cobol is the current standard in programming. Maguire's claim that his applications generator is "rolling over" Cobol is amusing and unlikely, to say the least.

However, if Maguire believes that his system is actually replacing Cobol, then the gambler in me smells a bet. So let me propose the following wager:

Let an independent group survey the data processing departments that use Software AG's Natural. I will agree to pay to a charity of Maguire's choice $5 for each site that states that the majority of all its present coding is being done Natural, if Maguire agrees to pay $1 for each firm that says it isn't so.

I can think of a number of causes to which I would like to donate my winnings.

Incidentally, this letter is not to condemn fourth-generation languages. Actually, I believe they will have a significant role to play in end-user computing and will end up coexisting with the third-generation languages very nicely. But to suggest seriously that the Cobol shops are going to replace the billions of dollars invested in existing programs in any language that is not the industry standard strikes me as very improbable.

My feelings on the issue can be summed up by a comment I heard at a recent conference at which one of the speakers was asked to predict the future of programming languages. The speaker responded by saying, "I don't know exactly what the definitive language will look like in the year 2000, but I know what it will be called — Cobol."

Kevin Kalkhoven
President
Dialogic Systems Corp.
San Jose, Calif.

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3317-8611

VIEWPOINT

Exploring new DP frontiers with in-house consultants

By MIKE EDWARDS

When Charles Darwin said, "Adaptability is the key to success," he was not referring to a modern DP organization, we can safely assume. His words, however, hold as much validity for today's information systems business as they do for a species. While we in information systems have proven very adept at handling the waves of new technology that reguarly sweep over us, organizational adaptability is not a characteristic commonly associated with us. The images of data processing managers fighting tooth and nail to prevent end-user computing from encroaching upon their empire is all too common in today's changing environment.

READER'S PLATFORM

Each time end-user computing rears its head, the DP manager sees the end of professionalism, corporate information system standards, integrated systems, compatibility and easy communications — he sees, in a word, chaos.

In some companies, management has decided to end what is perceived to be an expensive monopoly: A growing number of end users have been given the job of developing applications on their personal computers or minis, or even the mainframe, using information center tools. To the professional this is revolutionary, and the benefits, if any, are often marginal.

The root of the problem, and what is driving the information system manager crazy, is the entry of user-purchased micro and mini hardware and turnkey applications software. While attempting to fill a real need, many of these Trojan horse systems could not be justified if they were required to pass all the financial and other hurdles of a normal data processing project.

These backdoor systems are too often ill conceived; are too costly; lack standards; are incompatible with existing hardware, software and communications systems; and still do not meet the user's needs.

The user can counter that, if he had gone to the information system department, a feasibility study would have been necessary and his application would have gone to the end of a five-year backlog anyway. Under these conditions, can you blame him for going his own route?

The real question then is, How can information systems address user needs without compromising its corporate responsibility to provide integrated and effective information systems?

If this is beginning to sound familiar, it may be because today's problems resemble those of 20 years ago when we developed systems on the "back of a 5081." Come to think of it, occasionally we still use this method. In any event, are we doomed to repeat history? I think not. There is a middle ground that in practice seems to satisfy the diverse needs of the information systems manager for organization and the user for service. Remember, the perceived reality *is* the reality, and the user, client or customer is always right.

The in-house consultant is an idea whose time has come, which seems to meet the need and which has little, if any, downside.

The user wants service, the department wants technical and professional standards to be met, the information system person demands professional growth and the corporation wants effective and efficient business systems. All of these objectives can be met by placing the right information service professional into the user environment.

By any number of proven methodologies, such as reviewing a user's backlog, doing a situation analysis for a willing user — who is sometimes hard to find — or listening to the rumor mill, you can identify a potential project and seize the opportunity to satisfy a need. Boldly offer what no DP manager has offered before — the user's own consultant. Approach the user/manager with the idea that you will supply a dedicated professional with the right mix of experience to solve his immediate need. In fact, the information systems professional will reside on the user's premises, and you will provide on-going training, a career path and annual reviews. In addition, if the skill requirements change, you can replace the consultant where and when appropriate.

The users, on the other hand, get to direct the work they want done. In our experience, this works best if the position is funded by the user but the consultant is on the information systems payroll. When the project ends, the consultant is reabsorbed into MIS.

The key benefits are that a valuable corporate MIS resource is utilized fully and appropriately, corporate information systems standards are followed, the MIS manager keeps an eye on what's happening DP-wise in the company and the Trojan horse system becomes a friendly invasion. Everyone wins.

So what's the downside? There is none. If the professional is being underutilized in the user area, then with the user's permission, assign filler projects. Often what happens is that the information systems professional helps users sort out their needs and directs them to MIS when appropriate. The MIS professional also has vital connections to the information center and technical support groups, which are a requirement for effective solutions.

This apparently simple concept is not always easy to sell, but once your boss agrees, advertise it, and above all, remember Darwin's words and adapt.

Edwards is systems development manager at Maritime Telegraph and Telephone Co.

Peaceful coexistence: The Unix vs. MS-DOS debate

By ROBERT MARSH

Some observers still insist on positioning Unix in opposition to Microsoft Corp.'s microcomputer operating system, MS-DOS.

While neither Unix nor MS-DOS approaches perfection, both have a place in a small business, where they will work side by side. This sort of cooperation might come as a shock to boosters of both operating systems. However, Unix and MS-DOS go about their jobs differently, provide different types of services and have differing advantages — a perfect opportunity for coexistence.

In addition to its multiuser capabilities, Unix's main advantage is its status as a standard. Acceptance by all the major supermicro and mini manufacturers makes Unix a formidable standard.

READER'S PLATFORM

"

It is not difficult to see how Unix and MS-DOS can coexist.

MS-DOS is supposed to be a standard, too, but there are many differences among its releases. There are more variations among the MS-DOS releases than there are among all the available Unix versions. And MS-DOS shows no signs of slowing its rate of change.

The acceptance of one Unix version, AT&T's System V, makes the operating system even more standard. Additionally, /Usr/group, a Unix users group, has established a standard applications interface that helps put Unix beyond the control of any one company.

Unix's position as a standard has little to do with its technical merit. It is a good operating system, certainly, but it has limitations.

Industry pundits can argue for eternity about how Unix's popularity got rolling, but it is easy to see why it has accelerated: Everyone associated with it has something to gain from using it.

End users, particularly those in small businesses who often have limited budgets for computer services, probably have the most to gain from such a standard. If Unix runs on everything from personal computers to the Cray Research, Inc. Cray-1, users can upgrade their hardware without throwing away their software.

By the same token, users don't have to worry as much about whether the hardware they buy represents the wave of the future. A Unix-based system will at least have software support even if the hardware manufacturer goes away or changes its product line.

Hardware manufacturers also gain many benefits from using Unix. For example, manufacturers do not have to develop all the software for a new computer themselves. This allows fast product introductions and quick market acceptance.

In the past, proprietary operating systems have served to lock users into buying one manufacturer's products. But even the biggest computer companies no longer have the clout to use proprietary operating systems for this purpose. IBM's rapid acceptance of Unix makes that fact obvious.

Software vendors gain from the use of Unix because it furnishes a stable development environment. Firms feel secure about committing major resources to developing Unix-based software when they know the same Unix environment will be around for some time to come.

Many of the benefits ascribed here to Unix could be claimed for MS-DOS as well, despite MS-DOS' less standard status. No one is likely to claim, however, that the single-user MS-DOS is suitable for supermicros or minis, which are necessary for managing data that many users must access.

Additionally, allowing multiple users to share central computing resources will always be less expensive than giving each user his own computer.

On the other hand, personal computers — especially those based on MS-DOS — aren't going to go away. They will remain for the reason that they provide a user interface that Unix does not. PCs' bit-mapped graphics capabilities aren't provided for under System V, which was designed around ASCII terminal usage. And PCs offer the most cost-effective way to achieve responsiveness for intensely interactive tasks.

Given the relative advantages of Unix and MS-DOS, it is not difficult to see how they can coexist. Personal computers running MS-DOS can act as front-end systems for users who need highly interactive services. Those PCs can be networked to a multiuser supermicrocomputer or minicomputer running Unix for centralized, sophisticated access to company data. Users who do not need bit-mapped graphics can work with the same data via the multiuser system's ASCII terminals.

Software developers will ultimately determine how well this approach works. Those who provide ways for users to work with a centralized data base manager via PC programs such as Lotus Development Corp.'s 1-2-3 are headed in the right direction. Programmers should design their packages for both the ASCII and the bit-mapped graphics environments to achieve long product lives.

Standards are only as good as the trust people put in them, and something as pervasive as an operating system demands a lot of trust. So far, Unix is faring far better in this regard than many observers expected just a few years ago. As Unix proves itself, its benefits will become greater for everyone involved.

Marsh is chairman of Plexus Computers, Inc.

VIEWPOINT

TURNAROUND TIME
Larry Long

***Q** I manage a small credit union with eight employees, one of whom runs our computer center. I also do some work on the computer. Linda, our computer manager, has informed me that she has taken on a part-time job that will require her to work a minimum of 25 hours a week on weeknights and Saturdays. She assured me that her part-time employment will not impact her effectiveness here at the credit union. Linda has done outstanding work for us in the past, and we have no rules that prohibit taking on a second job. Linda's work has deteriorated since she took on the second job, and I have already asked our board to adopt a policy that would place reasonable limits on part-time employment. Linda says that she needs the extra job to make ends meet.*

We desperately need Linda. How can I implement this new policy and retain her?

An employer, whether primary or secondary, has every right to expect a 100% effort from an employee. It is the rare individual that can give this kind of effort while holding a full-time position and a part-time position that requires 20-plus hours of work per week. Apparently Linda isn't one of them.

Talk frankly with Linda about her obligation to perform to the best of her ability. If Linda is as valuable as you say she is, perhaps she is underpaid. It may be that Linda can cut back at her other job if you raise her salary. If the two of you are unable to reach a mutually agreeable solution, the only long-term alternative is to release Linda and hire someone else. Computer operations require constant attention, perhaps more than Linda is willing to give.

***Q** Five years ago, I purchased a personal computer for my home and quickly became interested in how I could apply it to my work. Now, seven years later I routinely use personal computers in my work as a product manager.*

I am one of eight product managers in the marketing department, but I am the only one who actively uses computers. During the last few months there has been a continuous parade of managers, including top management, stopping by to talk with me about how I am applying computer technology to my work.

On numerous occasions my manager has stated that he is proud of my work with computers and that he is very satisfied with my overall job performance. Ironically, he does not encourage the other marketing managers to use available personal computers as a tool in their work. I have never worked anywhere else, but it's hard for me to believe that our competition's managers would adopt such a laissez-faire attitude toward computers. Is this the case?

Information resource management via computers must be nurtured — it doesn't just happen. It's hard to say whether your company is typical, but I would estimate that fewer than 15% of companies in U.S. have adopted the attitude that information is valuable and should be treated as a resource.

In these companies, managers take every opportunity to encourage their subordinates to use the tools of automation.

***Q** I am currently evaluating available microcomputer-based word processing systems. The system selected will be used primarily by secretaries, and it will be used occasionally by other support personnel and managers. Can you give us some guidelines by which we can conduct our evaluation?*

All word processing packages provide the same basic editing features, but the ease with which a user can edit a document varies widely. In the typical office environment, the only extra features that I would consider essential would be the spelling checker and the mail merge feature. Other features, such as a thesaurus, grammar checker, index, table of contents and windowing, are nice to have, but their necessity is very much dependent on the application and who is using the system.

Be sure to determine which features are included in the purchase price. Some features, such as the spelling checker, may be sold as optional add-on features. User friendliness should, of course, be a consideration, but remember that once everyone learns to use the system, an overly user-friendly package can be cumbersome to use. The best packages provide seasoned users with shortcuts to issuing commands.

Make sure that the word processing software is compatible with your microcomputers and their peripheral devices. For example, any package that does not make effective use of the keyboard (that is, cursor control and function keys) should be discarded as an option. Also, make sure that the software supports your printers.

In any case, involve those who will be using the software in the purchase decision.

Encourage them to test-drive a few packages and provide you with feedback.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 9171, Framingham, Mass. 01701-9171.*

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HARDTALK
Jeffry Beeler

HP continues Spectrum saga

The recent announcement of Hewlett-Packard Co.'s first reduced instruction set computing (RISC) processors marks only the opening chapter in the continuing saga of the firm's much-publicized Spectrum development project.

Even as the dust settles from the introduction of HP's 3000 Series 930 and 950, succeeding chapters in the Spectrum story are already beginning to take shape.

In HP Laboratories at Palo Alto, Calif., researchers are looking for ways to exploit further the company's High Precision Architecture and turn what they see as its inherent strengths into future solutions for users.

Though extremely wide ranging, their research has singled out at least three technological specialties for in-depth attention. The three include natural language processing, multiple-processor systems and fault tolerance,. according to Ted Laliotis, HP's manager of technology market development.

Whether any of the parallel research efforts will ever bear commercial fruit is hard to tell. But on at least one point HP Laboratories officials seem to agree: The High Precision Architecture that underlies HP's latest generation of business systems supports advanced capabilities like multiprocessing and fault tolerance much more readily than the company's existing processor design with its comparatively limited power and flexibility.

See **HP** page 24

Beeler is Computerworld's *West Coast bureau chief covering systems & peripherals.*

Florida city seeks standards

Disparate systems hinder smooth communications

By Donna Raimondi

FORT LAUDERDALE, Fla. — Everett Knox, information systems director for this oceanside city, is a man in search of standards.

Knox is in charge of computing services for Fort Lauderdale, home to 155,000 people. Metropolitan departments that serve the populace should get what they need in the way of equipment, he says. "Life would be a lot easier for me if I only had one vendor to contend with, but my job is to provide solutions for people. And if I can't do it with one of the standards, then I have to go to any other system I can to provide the solution," Knox says, in discussing his ongoing efforts to provide smooth communications among systems.

The resulting mix of systems includes a new dual-processor Burroughs Corp. A 10 mainframe; word processing machines that include Wang Laboratories, Inc.'s Office Information System (OIS) 140, three OIS 50s, an OIS 60 and a VS 15; and microcomputers and supermicros that include models from Wang, IBM, Burroughs and AT&T as well as Xepix, Inc.'s Pixel series.

Knox said he hopes to employ IBM's Systems Network Architecture (SNA) and the LU6.2 communications protocol as standards for his disparate systems. "What I am trying to do is have the mainframe, the minis and the PCs around the city tied into an SNA-type network and use the LU6.2 to make it a peer-to-peer-type standard," he says.

"The biggest holdup in my timetable is the software itself and when vendors will make it available on the different pieces of equipment," Knox says. "In reviewing current literature, you can see LU6.2 as being the standard that they are shooting for, but even IBM has not gotten there all the way."

Wang Professional Computers and Advanced Professional Computers can con-

See **FLORIDA** page 27

Sperry boosts disk, tape storage capacity of Series 1100 family

By James Connolly

BLUE BELL, Pa. — Sperry Corp. recently added storage products to its Series 1100 mainframe family, including a tape controller featuring data compression and a high-density, reduced-footprint disk subsystem.

The Sperry 5061 magnetic tape control unit supports Sperry's 10½-in. Uniservo 36 tape unit and allows compression of text data at ratios of up to 4:1 and highly repetitive data at even higher ratios, according to Sperry. A maximum configuration includes two controllers and 16 tape units.

The compression capability is intended for users with large off-line storage needs by providing 350M to 700M bytes of data storage on a single reel. The 5061 is said to feature block numbering and concurrent spacing for improved file location and error recovery.

The 5061 allows two additional modes, a 5042 mode for access to uncompressed data tapes, and an EBCDIC-to-ASCII translation mode to permit exchange of data tapes with non-Sperry systems.

Scheduled to be available in the third quarter of 1986, the 5061 is priced from $60,300 for a control unit with tape block numbering and 5042 mode to $89,445 for a control unit with all three modes. Monthly lease prices range from $1,675 to $2,485, and maintenance charges range from $258 to $351.

The disk system is the Sperry 8481, which is said to provide 66% more storage than the 8480 in 50% less space.

The 8481 reportedly provides 2.7G

See **SPERRY** page 23

INSIDE

Frank Greene of Zero One discusses supercomputers in the commercial DP world/**22**

Edge Computer introduces its first supermini-based design system/**24**

NEW THIS WEEK

- Tektronix offers its Multibus-V development systems
- McDonnell Douglas announces a resilient system option for its M9200 systems

■ For more on these and other new products, see pp. 87-115.

INSTANT ANALYSIS

'Life would be a lot easier for me if I only had one vendor to contend with, but my job is to provide solutions for people.'

— Everett Knox, information systems director for the City of Fort Lauderdale

General Automation to announce high-end multiuser Zebra processor

By Rosemary Hamilton

ANAHEIM, Calif. — General Automation, Inc. plans to introduce a high-end multiuser system next week that supports up to 128 terminals and can be used as either a central or departmental host.

The Zebra 7820 operates under General Automation's version of the Pick Systems Pick operating system and is based on the Spectrum Manufacturers Association standards. The organization is made up of more than a dozen manufacturers of Pick systems and provides guidelines on which to design the operating system.

The 7820 has an entry-level price of $119,000 and supports up to 32 terminals. A typical configuration would support 40 to 60 users, according Rene Caron, vice-president of marketing. In its maximum configuration, the 7820 has double the capacity of General Automation's current high-end model, the Zebra 6700.

It comes with 2M bytes of main memory, expandable to 8M bytes; 260M bytes of disk storage, expandable to 2G bytes; 16K-byte cache memory; a ½-in. tape drive; an Intel Corp. 80186-based disk controller; an 80168 magnetic tape controller; and a two-port parallel printer controller.

The 7820 will be available in late May, Caron said. An upgrade package, which will replace the 6700's 68010 processor with a 68020, will also be announced next week, although pricing is not yet available.

Ridge announces Server/RT

Designed for PC-based, compute-intensive tasks

By Rosemary Hamilton

SANTA CLARA, Calif. — Ridge Computers, Inc. introduced a reduced instruction set computer (RISC) product last week that was designed to act as a server in a personal computer-based engineering environment.

The Server/RISC Technology (RT), which sells for $35,900, can be used to perform compute-intensive tasks for personal computers. The company said the product works with the IBM Personal Computer, PC XT or AT and compatibles. It can also be used as a file server, peripherals server, communications server or data base server in a microcomputer network, the company said. Since it is targeted at engineers, the product is expected to be used most often as a compute server, for such tasks as simulation, said Larry Lunetta, director of marketing and product planning.

Ridge also announced that ICT-Computer Drafting System, Inc. signed a $5 million deal to become the exclusive reseller of the Server/RT to dealers of Autocad, which is a computer-aided design software package for personal computers and is made by Autodesk, Inc. Ridge said it is negotiating with other resellers for other market segments.

"We consider the Server as investment protection for PC users who need more computing power," Lunetta said. "This way, they don't have to upgrade to a more powerful work-

See **RIDGE** page 23

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Command ===>

Project Title: Schedule for Well No. 121-005

Start Date (ddmmmyy): 01jul85

Holidays (ddmmmyy): 04jul85

	Activity	Duration	Tarf	Head	Target
1	Drill Well	4	1	2	.
2	Build Pump House	3	2	5	.
3	Install Pipe	2	5	7	10jul85
4	Construct Power Line	3	1	5	07jul85
5	Excavate	5	1	4	09jul85
6	Install Pump	6	4	7	.
7	Deliver Material	2	1	3	.
8	Assemble Tank	4	3	6	.
9	Erect Tower	6	6	7	.
10	Pour Foundation	4			
11					
12					
13					
14					
15					

Schedule for Well No. 121-005

JOB	ACTIVITY
1	DRILL WELL
2	CONSTRUCT POWER LINE
3	EXCAVATE
4	DELIVER MATERIAL
5	ASSEMBLE TANK
6	BUILD PUMP HOUSE
7	INSTALL PUMP
8	POUR FOUNDATION
9	INSTALL PIPE
10	ERECT TOWER

JUL 01 · JUL 04 · JUL 07 · JUL 10 · JUL 13 · JUL 16

LEGEND:
- DURATION OF A NORMAL JOB
- SLACK TIME FOR A NORMAL JOB
- DURATION OF A CRITICAL JOB
- BREAK DUE TO HOLIDAY
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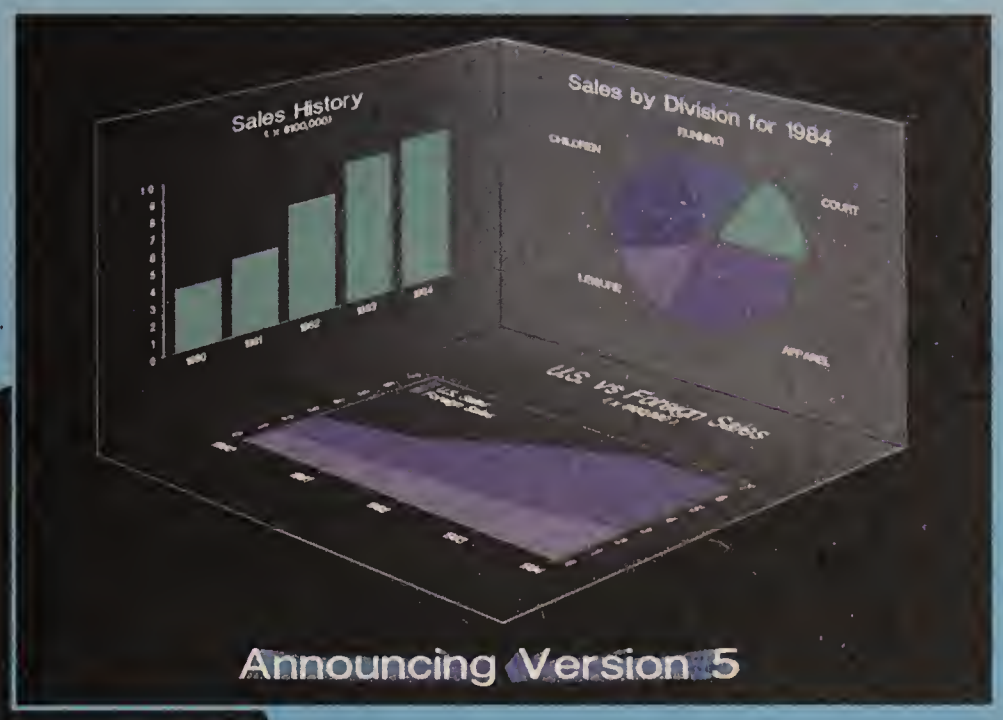

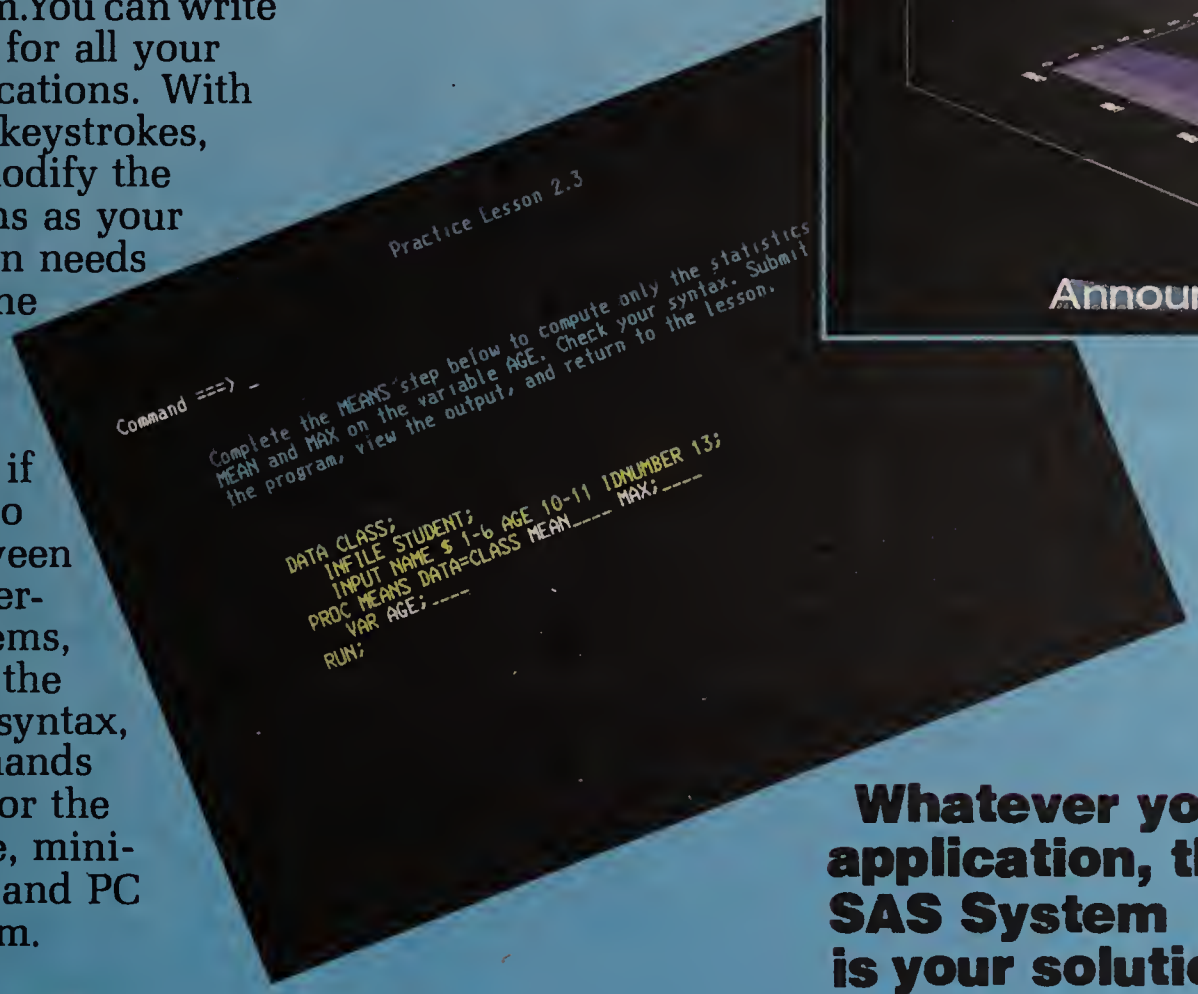

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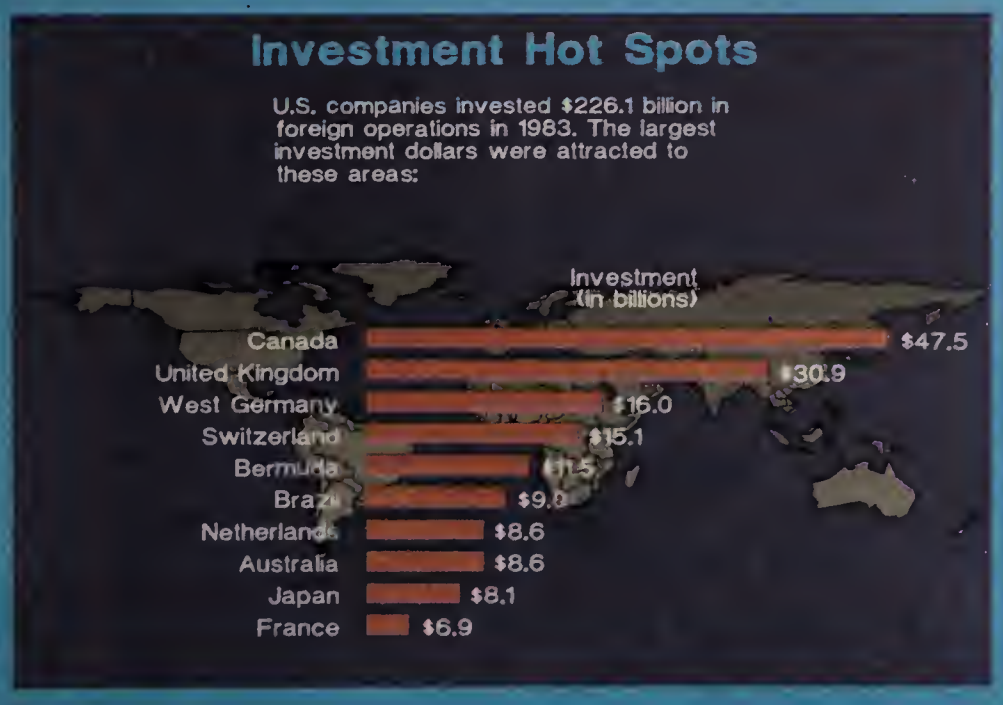

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Large commercial DP operations turn to supercomputers

Market may balloon to $3 billion in five years

By Donna Raimondi

Supercomputer use among large commercial organizations appears to be on the increase. As the proliferation of supercomputers continues — from a $600 million market today to a $3 billion market in five years, according to one analyst — many businesses are looking to benefit from the machines.

Frank Greene, president of supercomputer systems house Zero One Systems, Inc. of Santa Clara, Calif., consults with companies on supercomputer matters and runs some customers' supercomputer installations.

CW: What kind of businesses need supercomputers?
GREENE: The businesses that need supercomputers today typically include oil, automobile, aerospace and electronics companies. Emerging markets where companies will start using supercomputers are drugs and chemicals and a small area, which is interesting, is moviemaking.

CW: Who are the major vendors?
GREENE: Cray Research, Inc. has been the dominant vendor in the supercomputer market over the last five years. They have about 70% to 75% of the installed base worldwide with their four products. There are over 120 machines installed.

Historically, the other major vendor was Control Data Corp. They have about 35 of their CDC 205s installed today. CDC's supercomputer company, ETA Systems, Inc., should announce its first machine by late 1986 or early 1987.

The other vendors are the Japanese companies, which include Hitachi Ltd. and Fujitsu Corp. Those two are building IBM-compatible supercomputers, so they have taken a slightly different approach to the market. They are going after the IBM user. NEC Ltd. is the other Japanese company that has a supercomputer on the market today.

CW: Do you see the Japanese supercomputers taking over Cray's market because people will want to migrate from large IBM mainframes?
GREENE: The two kinds of machines have two different applications. The usual supercomputer has been used for what is typically a Fortran program — high-speed number crunching. Most of the IBM-type applications — even though it is true that there are some scientific/engineering applications — will be more a transaction kind of processing. There is some speculation that the Japanese machines will be used more for both kinds of applications, number crunching and transaction processing. But the marketplace is changing. Cray — which has been without competition for the last four or five years — is going to be facing more competition.

CW: What are some of the factors to look at when a company wants to add a supercomputer?
GREENE: The company needs to start off by looking at the size of the purchase. A supercomputer is, at least from a hardware point of view, a $6 to $20 million dollar purchase decision. Plus, the company can spend an equal amount or, in some cases, twice that amount for the other supporting items it needs in the way of facilities, communications equipment, front-end computers and support. There is a significantly increased computing expense compared with what might have been the computing expense with a mainframe.

CW: How would a company decide whether it needs a supercomputer?
GREENE: Typically, the company has been using some kind of computing for a long period of time. Users see that their current computer systems are either saturated or unable to do an overall complex problem that is required for the kind of products or kind of business that they are in.

CW: Is it difficult to cost-justify a multimillion-dollar supercomputer?
GREENE: Some of the best answers to this come from oil companies. They are doing three-dimensional seismic analysis for finding oil wells. They are often able to save the price of the supercomputer by not drilling an unnecessary oil well, which can cost $20 million in some cases.

In aircraft design, you can look at Boeing Co. It has sold $10 billion dollars worth of its 737 airplanes with engines that were designed with a supercomputer because they could not be designed in the traditional wind tunnel. If they were not able to design that engine, it might have been a much more costly modification to that airplane. Or they might not have been in that particular market. . . .

These products can easily provide millions of dollars of revenue. The loss of revenue some companies suffer from not having supers — in some cases that loss of market share — can have a significant impact on the overall business.

CW: Is anybody throwing business applications on supercomputers?
GREENE: There has been a lot of talk

See **GREENE** page 23

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GREENE from page 22
about developing some good data bases, but I haven't seen much that has really been developed yet.

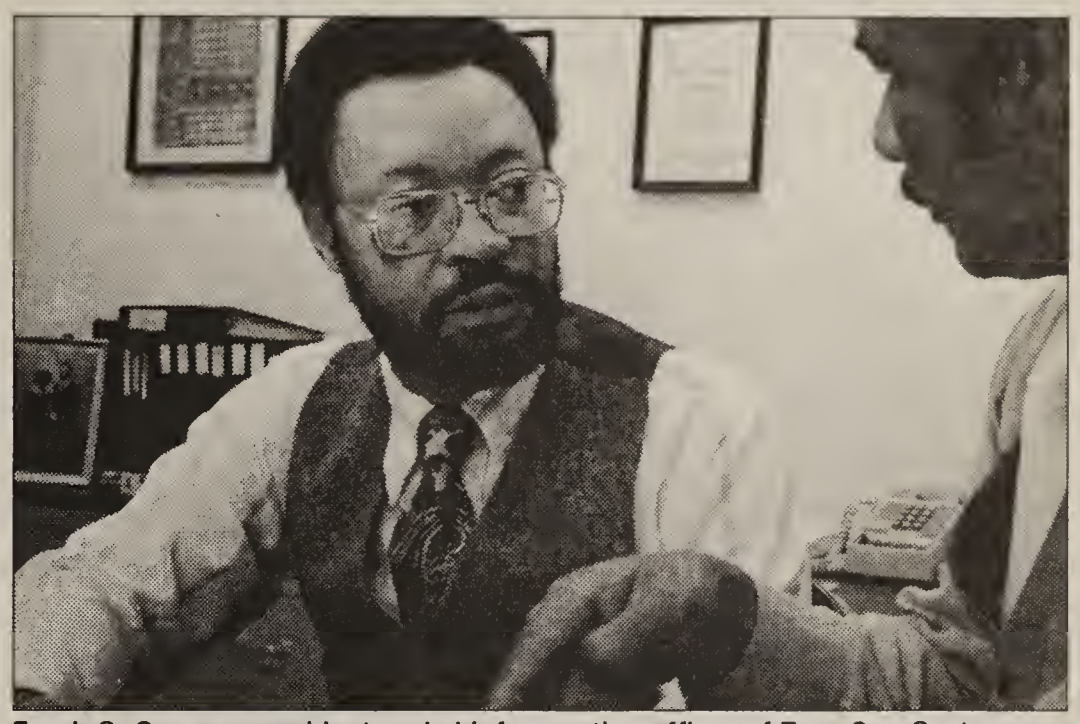
CW: Please go through the steps you would go through with a company that wants to buy a supercomputer.
GREENE: The first step is a needs analysis, done by the customer or by Zero One, that examines the need for a supercomputer. It would have to look at the applications, or the bottlenecks or the problems that have to be solved with a larger machine than the company has today. From that, we would develop a system configuration for the company's needs based on the forecast of needs for the next three to five years. Then we would offer either to buy that system for the company or advise it on how to buy the system.

We could even get it integrated and install and operate it for the customer. The company should know that a supercomputer system includes not only the back-end mainframe but also the front-end computer, the networking, how the super might tie into existing systems and the kind of terminals and workstations needed to give users access to the system.

CW: Then you do some tracking to be sure the supercomputer is being used efficiently?
GREENE: When we operate a system for the customer, or if a customer wants us to come in, we do performance analysis to see how well the system is operating with its actual problems. We try to identify where bottlenecks are and identify the solutions to those bottlenecks.

In actual working situations that often means that programs are on average only running at 5% to 10% of the peak speed of the machine, so there is obviously a lot of room for improvement.

CW: What are some of the special problems a new user could have?
GREENE: There is a problem with training. Supercomputers offer a different approach to problem solving than people are used to. Historically, universities have had minicomputers, so few people are trained in supers. There is a real scramble to train people.



Frank S. Greene, president and chief executive officer of Zero One Systems

Ridge announces Server/RT

From page 19

station and make their existing hardware and software obsolete."

The Server/RT uses a RISC-based CPU and operates under a Ridge operating system that is based on AT&T Unix System V with University of California at Berkeley 4.2 enhancements. A basic model has 4M bytes of main memory, a 300M-byte disk, an Ethernet cable, four RS-232 ports and a tape cartridge drive. The product, which can support more than 25 users, will typically support 15.

The package includes software that will reside on a PC and provide communications between the desktop computer and server. Current users of Ridge computers can purchase a $1,000 software package that will give them access to the server.

Sperry boosts series' capacity

From page 19

bytes of formatted data storage. Four 8481s can be configured with two Sperry 5057 controllers and a dual-access interface to provide 10.7G bytes of storage. The 8481 can be upgraded to a cache/disk system with the addition of a Sperry 7053 storage unit, according to Sperry.

The 8481 is set for second-quarter 1986 deliveries at a cost of $443,610 for a 10G-byte system. The lease price for the same system is $12,322, and maintenance costs $1,650.

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Edge on verge of first product

Start-up to announce design workstation

By James Connolly

SCOTTSDALE, Ariz. — A 3-year-old start-up company is scheduled today to introduce its first product, a design workstation that the firm claims provides the CPU performance of a Digital Equipment Corp. VAX 8600.

Edge Computer Corp. said it is directing the Edge1 at a workstation market that demands more CPU power than does the market served by other workstation vendors such as Apollo Computer, Inc. and Sun Microsystems, Inc. An Edge spokesman said the Edge1 provides four to five times the power of DEC's VAX-11/780 superminicomputer. "We think that for the first time someone is addressing superminicomputer performance in a desk-side workstation," said John M. Cencioso, director of marketing for Edge.

Edge will offer the Edge1 primarily to OEM customers. Although no customers have agreed to buy the system yet, Edge has several installed at unidentified beta test sites.

The Edge1 runs Guaranteed Share Unix (GSX), an enhanced version of AT&T Unix System V.

A proprietary, CMOS-based 32-bit CPU uses separate buses and memory groups and fetches instructions and data simultaneously for a memory bandwidth 64 bits wide. A dual four-stage pipeline feature overlaps execution of multiple instructions and uses special data paths and branch prediction hardware to keep the CPU pipeline full. The dual memory management unit is on a 40M byte/sec. system bus and has two address caches to provide simultaneous virtual-to-physical address translation for two addresses. The maximum main memory is 64M bytes.

The system supports up to four Intel Corp. Multibus and four Motorola, Inc. VMEbuses with an aggregate I/O bandwidth of up to 16M byte/sec.

Edge1 will be available with either color or monochrome, 1,280- by 1,040-pixel, 60Hz, noninterlaced displays. It features 10M pixel/sec. three-dimensional polygon generation. It supports disk drives ranging from 80M bytes to 500M bytes. Edge1's networking capabilities include Ethernet, General Motors Corp.'s Manufacturing Automation Protocol and Sun's Network File System. Volume production is scheduled to begin in the third quarter of 1986.

Prices in quantities of 100 begin at $45,000 and suggested list prices begin at $75,000. A typical configuration with 8M bytes of memory, a color monitor, a 167M-byte disk drive, a floppy disk drive and a floating-point accelerator costs $63,000 in OEM quantities and is expected to cost the end user $100,000.

HP continues Spectrum saga

From page 19

On the natural language front, the company has confined all its research thus far to software. But nothing in HP's revised mainframe design precludes the vendor from someday implementing a natural language capability in hardware.

"High Precision Architecture was designed with the idea of having special-purpose processors dropped in to increase a system's efficiency," Laliotis said.

For years, HP Labs has reportedly sought to couple natural language processing capabilities with expert systems technology. One possible application of the company's unified research approach might be an intelligent office assistant that users could customize to interpret selected natural language phrases or commands, according to Steven Rosenberg, manager of HP Labs' expert systems department.

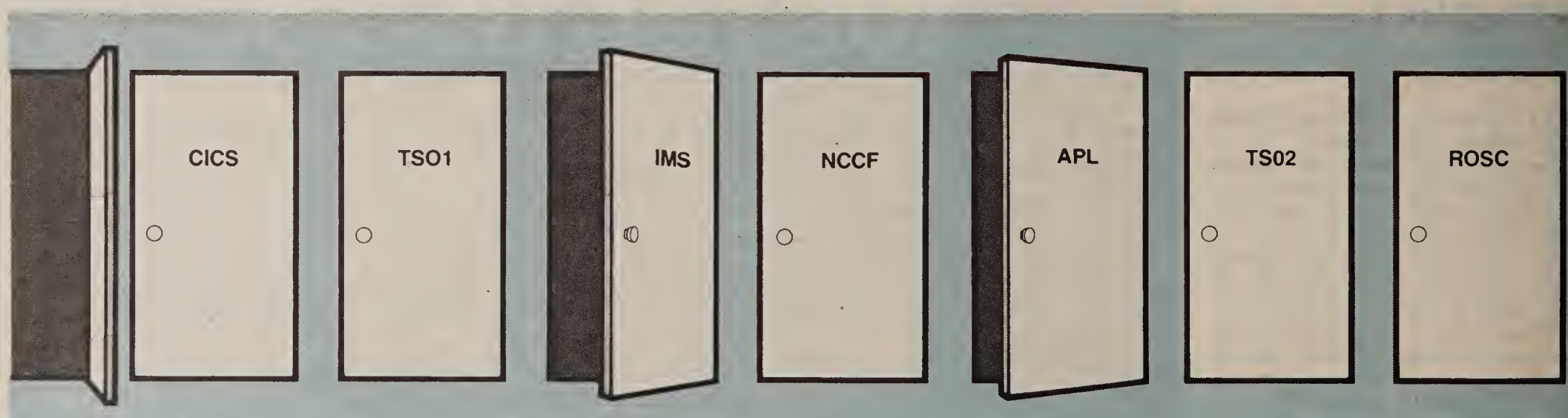
If, for example, a business executive wanted to retrieve a high-priority subset of mail messages, the request could be expressed in ordinary English and entered into the office assistant through its natural language processor. From there, the request would proceed to the proposed product's expert systems component, "which would then select the information it needs to answer the original question," Rosenberg said.

The ability to support natural language processing reportedly depends on a number of systems' capabilities, including high throughput, large address spaces and memory management. All three technological requirements are reportedly met by High Precision Architecture, which provides 64-bit addressing and a design simplicity that optimizes performance, Laliotis said.

On the multiprocessing and fault-tolerance fronts, meanwhile, HP is exploring ways of capitalizing on the architecture's bus structure and interface design, which "we developed from scratch to work well in a multiple-processor environment," he said. "As our customers buy more and more machines, we have to come as close as possible to providing a linear relationship between the number of processors a user installs and their combined output."

HP's growing interest in linear expandability, multiprocessing and fault tolerance may sound reminiscent of Tandem Computers, Inc. and other companies specializing in on-line transaction processing. Even so, HP still has no firm plans right now to enter the on-line transaction processing business and compete directly with the likes of Tandem, Laliotis said. On the other hand, he stopped short of ruling out such a possibility.

Why does HP view High Precision Architecture as a potentially suitable foundation for fault tolerance? The answer lies mainly in the architecture's reputed simplicity. "Obviously, the simpler a machine is, the less likely it is to fail," Laliotis said.



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Florida city seeks standards

From page 19

nect to both the word processing systems and the mainframe and can also run IBM Personal Computer software under IBM's PC-DOS by using various versions of Intercomputer Communications Corp.'s (ICC) terminal emulation software. Therefore, they are standard issue for Fort Lauderdale's users. However, when the standard issue does not fit, other systems are brought in. AT&T has been selected to provide a million-dollar automation project for the police department, for example, with its 3B2 supermicrocomputers and 3B5 minicomputers.

Eighteen of the city's 50 Wang Professional Computers are connected in a local-area network — Wang's local interconnect option — so that users can share information. Data can be extracted from the Burroughs DMS2 data base on the mainframe via B&L Associates, Inc.'s Microtalk data extraction and manipulation software that resides on the mainframe. Then the ICC terminal emulation package, which resides on both the mainframe and the micro, sends the data along to the microcomputer.

"The comptroller can go into the data base on the mainframe, extract some information — say on a capital improvements project — downline load it into her Microsoft Corp. Multiplan on her PC and work with it. Now everybody else that is connected up in that local-area network can look at that Multiplan and work with it also," Knox explains.

"We have not given users the capability of sending back to the mainframe, however, except on a transaction basis," Knox says. Security is the primary problem. Until some practical way to audit users' entries comes along, uploading will be forbidden. "Otherwise, we are going to have a nightmare trying to determine why something went wrong or why somebody is changing things. We have to know what they are doing," he adds.

> ***'I think the answer to our problems lies in communications.'***
>
> — Everett Knox
> City of Fort Lauderdale

A truly distributed processing environment would make many of the users' jobs easier. In the water department, for instance, an IBM Personal Computer XT is used by the water meter readers. Meter information is input into hand-held microcomputers as the readers go from house to house. The information from the devices of eight meter readers at a time is loaded into the XT, where a batch file is created to be sent to the mainframe at night.

Optical character recognition readers scan the water bills when they are received with checks. An operator inputs the amount of the check. "We may have 1,000 of those in a day, and at the end of the day, we will batch them up into a file and then upline load it from the micro to the mainframe, but every one of them is an individual transaction," Knox explains.

"I think the answer to our problems lies in communications. Unix is the standard I would like to set on for the mainframe all the way down to the last, lowest multiuser system. I want PC-DOS on the individual micros and then communications between all of that. That really is the key. It won't make any difference if I have IBM or Wang or Burroughs if I can communicate and do it on a peer-to-peer relationship," Knox says.

Middle managers found hardest users to reach

By Donna Raimondi

FORT LAUDERDALE, Fla. — The biggest problem in training computer users in Fort Lauderdale is reaching the middle manager.

"Professionals — acccountants, architects, engineers — are the best. They have been through college courses in computers, and they want to use that knowledge," says Everett Knox, the city's director of information systems.

Clerical workers accept the computer after they have been exposed to demonstrations and a good training program, Knox adds. Executives like to try out office automation functions and keep calendars and schedules on microcomputers.

Middle managers, however, are reluctant and know the least about computers. The managers realize that the computer, while it is only a tool, does require that you do your job a little differently. "You just don't bring a computer in there and stick it on top of a desk. You have got to change your procedures. You have got to be able to integrate your job into a more productive way of completing a task," Knox says.

Knox says he tries to overcome people's fear of computing by designing systems for them in front of their eyes. "As we are talking, we will design a screen, make a file, and users learn in that process. It goes over very well. The users feel like it is their system, like they designed it from the ground up, which they did."

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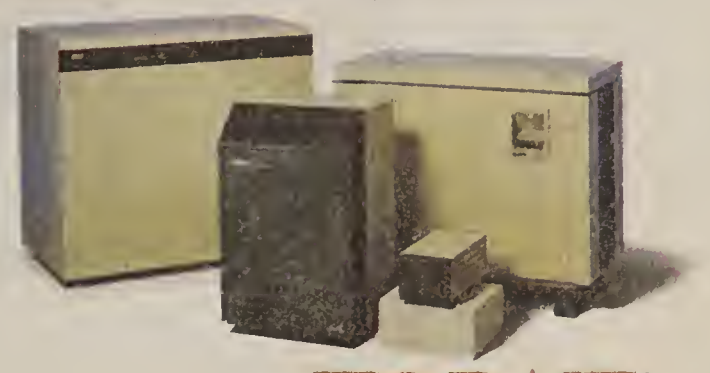

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SOFTWARE & SERVICES

SOFTLINE
William H. Inmon

Noting some DP milestones

The rites of passage in the computer industry have been marked by many milestones — going from punch cards to magnetic tape to DASD, moving from vacuum tubes to transistors to semiconductors, advancing from assembler to Cobol to fourth-generation languages.

But one of the least noticed yet most important industry milestones is the change in the notations and conceptualizations used by its practitioners.

If one doubts the importance of notation, consider the state of the world if the norm were still Roman numerals. Without zero, which the Romans lacked, some very important conceptualizations go unexpressed. Consider doing standard mathematical operations with Roman numerals. How much is MCMLXVII divided by CIX?

The notation of the times reflects the times themselves. So it is with data processing. One milestone of the rites of passage of DP is the representation of data.

In the first stages of data processing, fields appeared in an 80-column card. The program referred to the fields through a template or a mask, often expressed in a computer layout fit for Cobol or Fortran. Such Cobol layouts are considered one-dimensional representations of data.

Soon the world of punch cards gave way to magnetic tape, and the 80-byte layout expanded to N bytes. Even with

See **NOTING** page 38

Inmon is a director at Coopers & Lybrand in Denver, an author on the subject of data base design and a regular contributor to Softline.

Price cuts may prove costly

Observers contend software industry health is threatened

By John Gallant

David Lowry fears a cancer is threatening both the mainframe software industry and users who rely on packaged software.

The cancer is selective price cutting, says Lowry, president and founder of Data Design Associates, and last year, it reached deeply into most segments of the software industry. Lowry and other observers say 1985 saw some of the most aggressive price cutting in the brief history of the software market, as slump-ravaged vendors sliced list prices — reportedly as much as 50% in some instances — to win competitive dogfights.

Data Design Associates' Lowry

By nearly all accounts, price cutting slowed somewhat when most vendors' fiscal years ended at the close of 1985. Even Lowry, who claims his Sunnyvale, Calif.-based financial applications company does not stray from its quoted prices under any circumstances, admits the first quarter of 1986 has not been marked by rampant price cutting. But cutting, which usually is not evident in the early months of the financial calendar, is still occurring. And if the fortunes of the software industry do not improve markedly, Lowry says, price cutting may heat up to 1985 levels, and the long-term impact on users and vendors could be severe.

Lowry and others say the loss of revenue attributable to price cutting will lead to reductions in spending in such critical areas as R&D, support and training. "That will have a profound effect on the health and future of the mainframe software market and its customer base," he says.

In addition to slashing list prices, Lowry says, vendors hoping to cement a sale often throw in additional software or maintenance and support contracts at no extra cost — thus mortgaging future revenue for the current bottom line. If profits slip because of price cutting — and observers believe that happened to some key vendors last year — the

See **PRICE** page 40

SOFTWARE NOTES

Convex enrolls college in research

The University of Texas at Dallas and **Convex Computer Corp.** recently announced a research program for the theoretical development and practical application of algorithms for the advancement of supercomputer technology.

■

Telesoft was recently awarded a contract from **IBM**'s **Federal Systems Division** to provide Ada compilers that will run under both the MVS and VM/CMS operating systems. Initial delivery has been made, and the compilers will

See **NOTES** page 34

Adesse founders part company

By Rosemary Hamilton

Two founders of Adesse Corp., one of the first ventures to capitalize on third-party opportunities in the now-thriving VM software and services market, can no longer justify the union.

In a recent interview, Romney White said his departure from Adesse Corp. gives him the opportunity to help users of IBM's VM operating system. That, he said, is more important than making profits.

The view of Gerald DePass, president of Adesse, is that he and White "were not cooperating as business owners should for more than a year." He added, "I have no ax to grind. White is perhaps one of a kind.

See **ADESSE** page 32

INSIDE

Silogic announces a modular product for developing commercial expert systems/**34**

Systems Strategies unveils a product implementing IBM's LU6.2/**38**

NEW THIS WEEK

- Honeywell offers the Integrated Query System
- Comserv enhances Amaps/3000

■ For more on these and other new products, see pp. 87-115

INSTANT ANALYSIS

"The essential nature of the computer industry is shifting toward the service components of the product mix — consistent with the changes in the economy as a whole.

— An L. F. Rothschild, Unterberg Towbin analysis of the computer software and services industry

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Oracle unveils productivity tools for SQL/RT on the IBM RT PC

Oracle Corporation has announced six software products for the newly-announced IBM RT PC system. The packages run with IBM's SQL/RT relational DBMS, which was developed by Oracle for IBM. Oracle also announced immediate availability of its full ORACLE product line on the RT PC/AT co-processor.

According to Oracle Director of Product Marketing, Ken Cohen, "The SQL/RT product which IBM is marketing on the RT PC provides a robust relational DBMS. Since Oracle was the source of SQL/RT, we feel well-suited to offer our other products directly. They provide even greater flexibility and decision-support capabilities to RT PC users."

☐**Pro*Fortran**: The Pro*Fortran precompiler allows RT PC programmers to embed SQL database language statements in the middle of their Fortran programs. It is intended for Fortran programs which must access or manipulate SQL/RT database information.

☐**Pro*SQL**: Pro*SQL is a general-purpose call-interface to SQL/RT. Using a simple set of programming calls from a variety of languages supported on the RT PC, the programmer can access SQL/RT.

☐**SQL*IAF**: The SQL*IAF (Interactive Application Facility) package is a complete application generator and run-time system for forms-based applications. It is a complement and extension to the Easy SQL/RT component of IBM's SQL/RT.

The SQL*IAF screen painter lets users design forms using *what-you-see-is-what-you-get* techniques. Multi-table query/update forms can be easily produced for demanding applications. Also, SQL*IAF lets users apply data editing and validation criteria to data entered into forms. Finally, SQL*IAF provides extensive support for non-IBM terminal types, such as DEC's VT-220.

☐**SQL*RPT**: SQL*RPT is a report writer and formatter for use with SQL/RT. Using simple commands, users can create reports of almost unlimited sophistication from their databases.

The database information can also be included in documents formatted with SQL*RPT, allowing text and database processing to be combined in one easy-to-use interface suitable for developers and end-users alike.

☐**SQL*Calc**: SQL*Calc is a Lotus 1-2-3 compatible spreadsheet integrated with the SQL/RT DBMS. Users can place SQL statements into the cells of their spreadsheets, retrieving and updating SQL/RT data automatically. Large SQL/RT databases can be shared among spreadsheet users, with all of the database instantly available to them.

☐**SQL*Link**: SQL*Link provides a micro-mainframe link which allows intelligent transfer of database information between SQL/RT on the RT PC and the ORACLE relational DBMS running on IBM PCs and a variety of mainframes and minis.

SQL*Link lets users exchange information between PCs with ORACLE and the RT PC, with the RT PC serving as a Host.

The package also lets users of SQL/RT exchange database information with a mini or mainframe running ORACLE.

☐**PC/DOS Support**: The ORACLE relational DBMS, 4GL and DSS tools are also available to run on the IBM RT PC/AT co-processor option.

Oracle produces and markets the ORACLE relational DBMS, 4GL and DSS software. ORACLE runs on a wide range of computers, including IBM mainframes, DEC, DG, HP, Stratus and most other minicomputers, and a wide variety of micros, including the IBM PC family.

Oracle distributes its products through a worldwide network of 30 direct sales offices, through the Authorized Oracle Dealer network, and through VARs which participate in the Oracle Alliance program. With its direct and OEM marketing efforts, ORACLE is used by 39 of the top 50 multi-national corporations and at thousands of sites overall.

For further information, contact Oracle Corp., Dept. CWST3, 20 Davis Drive, Belmont, CA 94002, 1-800-345-DBMS.

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SOFTWARE & SERVICES

Adesse founders part company

From page 31

But we're better off apart. . . . Now I'm in a position to concentrate on doing business."

A new venture

The conflict apparently worsened for more than a year. White broke his ties officially late last year. By early 1986, he had launched his own VM company called VM/CMS Unlimited.

According to DePass, White's settlement included a sum of money, the amount of which he would not disclose, and two software packages, one that White had authored and Adesse was marketing and one that was under development.

DePass said the loss of the products will have a minimal effect on Adesse. "It hurts the bottom line a little bit, but it wasn't that big of a seller anyway," he said, referring to VM/SP Single System Image, a software package that enables VM-based CPUs to communicate with each other and present a single system image to users. "We have no plans to replace it," he said, "because we have other products in the mill."

Falling short of goal

White said he left because of his dissatisfaction with his ability to accomplish his objective. "I'm more interested in solving problems than making money. I'm more concerned with quality than with quantity," he said.

White's new company, located outside Massachusetts' high-technology region in a blue-collar section of Boston, will offer packaged software, contract programming, educational services, consulting and friendly advice. Friendly advice? "I think it's important that people with VM be able to use it properly," he said.

> ***'I'm more interested in solving problems than making money. I'm more concerned with quality than with quantity.'***
>
> — Romney White
> VM/CMS Unlimited

White said he has no blueprint for the new company.

"We'll try to be driven by the market instead of trying to force-fit users' problems to our solutions," he said.

A peaceful coexistence

White and DePass said they expect the two companies to coexist peacefully in the VM market. They will not directly compete with each other — DePass said White has signed an agreement to that effect — and each man said he feels there is enough of a market for many VM companies.

The market exists because IBM did not provide all the necessary additional tools VM users wanted.

In the early 1970s, when VM was first introduced, users like White — he was involved with one of the first installations at the University of Waterloo in Waterloo, Ont. — found it to be an easier alternative to the traditional time-sharing systems.

Although it was easier to use, VM also lacked added features, such as a backup system. In the early 1980s, companies like Adesse sprung up to provide users with the added features.

IBM recognizes lucrative market

Over the past year, however, IBM has recognized that there is a hot VM market, and it has begun to offer its own VM-related products.

Although this could spell trouble for the independent software suppliers, White said, "it doesn't keep me up at night.

"We think we'll be successful by providing high-quality solutions. And we're willing to sacrifice profit for quality," White said.

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SOFTWARE & SERVICES

Knowledge Workbench bows

Builds expert systems for commercial use

By Eddy Goldberg

LOS ANGELES — Silogic, Inc. recently announced a modular development environment for building expert systems. The product, dubbed Knowledge Workbench, consists of three modules: a Prolog compiler and interpreter, an expert system shell and a natural language processor.

The expert system shell module can be used to develop menu-based programs for business users unfamiliar with Prolog.

The product is intended for developing commercial applications of artificial intelligence, said Silogic spokeswoman Lee Clayton.

An interface to data base management systems allows developers to build knowledge-based systems using existing data. Knowledge Workbench currently works with data from Unify Corp.'s Unify relational DBMS.

A knowledge-base management system stores Prolog clauses and controls and accesses those files just as a traditional DBMS handles data files.

Knowledge Workbench also has a Prolog-to-C language interface.

The Knowledge Workbench core costs $7,000. The Inexact Reasoning Module costs $1,500, and the Natural Language Processor is $12,500.

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Notes: HP, Cadre join in CAE pact

From page 31

be used by IBM on federal government projects.

■

Hewlett-Packard Co. last week announced an agreement to integrate **Cadre Technologies, Inc.**'s **Teamwork/SA** package into Hewlett Packard's software development products for computer-aided software engineering (CAE).

The two companies agreed to share technology, perform joint development and incorporate product enhancements to benefit each company.

■

Pyramid Technology Corp. recently announced a $1 million technology licensing agreement to develop **Unix**-based versions of **Verdix Corp.'s Verdix Ada Development System** for the **Pyramid 90X** series and **Workcenter** superminicomputer product lines.

■

Alsys, Inc. recently signed a cooperative development and joint marketing agreement with **Hunter & Ready, Inc.**, developers of the **VRTX** real-time operating system. Alsys will develop a series of Ada cross-compilers for VRTX.

■

VM Personal Computing recently announced an agreement to package its **Relay** communications software with **Omnitel, Inc.'s Omnipak** multifunction board, **Encore 2400HB** modem and the **Encore 1200HB** modem.

■

OCLC Online Computer Library Center recently acquired a license to use the software implemented in **Telecom Canada's Inet 2000** intelligent data network. OCLC will use the software in its private telecommunications network to provide intelligent gateway features to its member libraries.

■

The **Association of Data Processing Service Organizations, Inc.** (ADAPSO) recently announced that it has joined the **Institute for Certification of Computer Professionals.**

ADAPSO said the move was part of its efforts to ensure the highest level of professionalism in the certification of professional software services personnel.

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The race is on. And it looks like Concurrent Computer Corporation is about to take the lead.

Concurrent
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Noting DP milestones

From page 31

the N-byte layout of magnetic tape, the representation of data was still essentially one dimensional.

The limitations of magnetic tape as a medium soon became obvious, and the world turned to data base management systems and to DASD.

With DBMS was born the two-dimensional representation of data, often in the form of a hierarchical data structure.

DBMS usually did not measure up to the billing it was given.

To most shops, implementing a DBMS meant converting sequential master files into data bases on DASD. Such an approach did take advantage of DBMS as a tool to access data directly but did not take advantage of it as a tool to integrate systems. Indeed, the advantages of DBMS as a integration tool outweigh its advantages as a direct data access tool. However, the integration of data was hindered by the 2-D notation of data.

Integration of data requires viewing the same data in multiple ways — three dimensionally — and the 2-D hierchical notation proved inadequate. To reflect the 3-D perspective of data properly, a new notation was required. The notation had to reflect both the commonality of integrated data and the uniqueness of the disparate views of data. Thus, the "is a type of" data notation was born.

For example, a bank account can be a loan or a savings account. For each account, there is a date it was opened, a place it was opened, a balance and other data. There can be multiple occurrences of activity against the account. Each type of activity has a date, location and amount associated with it.

There are three types of activity: teller activity, payroll activity and mail activity. Each teller activity has a teller name and branch. Each payroll activity has the employer's identification number and bank. Each mail activity has the postmark of the parcel, the address from which it was received and who received it.

Each loan has an officer associated with the loan, as well as the fund from which the loan is to be paid, whether or not there is a balloon payment and the payoff amount. In addition, one or more accounts may be pledged against the loan.

The notation can easily be translated into a hierarchical, relational, network or flat file format. It is truly implementation independent.

The notation is able to represent both the commonality and uniqueness of data, which are required for a 3-D perspective of data. Data to the left of an "is a type of" construction appears for all types of occurrences. Data to the right of the "is a type of" construction appears only for the particular data with which it is associated. The standard occurrences notation — taken from hierarchical structuring — coupled with the "is a type of" notation, allows the data to be viewed in a form conducive to an integrated environment.

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LU6.2 tool announced

NEW YORK — Systems Strategies, Inc. recently announced CSNA/LU6.2, a full implementation of IBM's LU6.2 enhancement to its Systems Network Architecture (SNA). The product is said to provide any general-purpose computer system or intelligent special-purpose device with peer-to-peer connectivity and program-to-program communications capability over SNA.

The product is written in the C language and is portable to operating systems including Unix, Microsoft Corp.'s Xenix, Ryan McFarland Corp's RM/COS and Intel Corp.'s lrmx-86.

The initial license fee for the source code is $150,000 for a PU2 version and $200,000 for a PU2.1 version. This includes 50 free units, after which royalties apply, with price breaks at 500, 1,000, 5,000 and 5,000-plus units.

Both versions will be available in September.

— Eddy Goldberg

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Price cuts may prove costly

From page 31

software industry will become less attractive to investors, and the flow of needed capital will dwindle.

Users seem to concur. Glenn Lukowicz, director of MIS at the Speidel Division of Textron, Inc., says the relationship between price cutting and a vendor's future vitality is "cut and dried." He adds, "Most of the vendors will disagree, but users are buying at significantly less than the quoted price in the majority of situations. Something has to suffer when vendors cut price. I think the first thing to suffer will be R&D, then support. Price cutting cannot help but hurt."

> ***'Every vendor of every product has engaged in price cutting at one time or another. But it is no different now than in the past. I don't see it getting worse. It has always been there.'***
>
> — John Cullinane
> Cullinet Software, Inc.

Harmful to users and vendors

Lowry's counterparts, the top executives of the applications and data base management system companies, agree that consistent, widespread price cutting would be harmful to users and vendors. But vendors are loath to admit to price cutting practices — or at least to initiating price slashing — and some see it as simply a natural outgrowth of a competitive market.

Opponents of price cutting admit its immediate impact on the software industry and its players is difficult to assess, but they argue that the slump of 1985 may have been exacerbated by earlier price wars.

"Discounting in prior years was part of the problem," Lowry says. "When a product is marked way down or given away to move it out the door, the vendors are artificially saturating the market. It hurts all vendors in subsequent years because people don't need to buy the systems because they have been given away."

Effects of cutting prices

While the cause-and-effect relationship between price cutting and poor vendor performance is not straightforward, observers are quick to point out that the specter of price cutting has visited some of the most important vendors in recent days.

Some analysts contend, for example, that Applied Data Research, Inc.'s (ADR) acquisition by Ameritech will give the Princeton, N.J.-based DBMS vendor the financial resources needed to use pricing as a strategic weapon. But ADR President Martin Goetz says that is not the case. "Ameritech gives us the deep pockets necessary to accelerate our development and support efforts and the resources to offer software leases but not to engage in price cutting," Goetz says.

ADR recently restructured its pricing policies [CW, March 10] to allow users to acquire products on a monthly lease basis. ADR also reduced the rates for its current three- and five-year product leases. "We are trying to move our customers to leases," he says. "That removes the pressure to cut prices. Most customers don't want to pay large up-front charges."

Goetz notes that even IBM has begun to practice price cutting by offering DB2 purchasers the equivalent of six months free use of the product. A spokeswoman confirmed that, with the announcement of Release 2 of DB2 last month, IBM offered buyers of DB2, QMF and the data extract product a six-month monthly license charge allowance that can be applied to the initial license charge. A user choosing to apply the six-month license fee waiver could forgo paying the $16,050 initial license charge for DB2. The special offer will be in force through the end of September, the spokeswoman said.

"IBM has chosen to formally discount," Goetz says. "Basically, it is cutting prices for the first six months. That just adds more pressure for others to discount."

Industry analysts also say that Cullinet Software, Inc.'s recent settlement of civil litigation brought by the U.S. General Services Administration (GSA) resulted from price cutting. Cullinet agreed to pay $615,000 to the government, which contended that the Westwood, Mass.-based firm had not disclosed to the GSA discounts it had given to its commercial customers. In settling the dispute, Cullinet did not admit to the claim, and Chairman John Cullinane flatly denies the matter stemmed from price cutting moves by the company. "No," Cullinane says, "it had nothing to do with price cutting."

In addition, observers claim the difficulties applications vendor Walker Interactive Products, Inc. encountered last year stemmed from price cutting. Price wars, they say, made it more difficult for smaller players like Walker to prosper.

Price cutting overblown

But John Imlay, chairman of Atlanta-based applications giant Management Science America, Inc., says the price cutting issue is overblown — especially in Walker's case.

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"Walker's problems didn't have to do with price cutting. The company just sold more than it had. Not having a full line of products seems to me to be a bigger danger to a small company than price cutting," he says.

"Price cutting is not as rampant as everyone makes it out to be," Imlay says. "People say our own margins should have been higher last year. But it wasn't price cutting that did that; it was a general slowdown in purchasing."

Cullinane agrees. "Every vendor of every product has engaged in price cutting at one time or another. But it is no different now than in the past. I don't see it getting worse. It has always been there. Sure, if price cutting became rampant, it would have to be felt somewhere. It would be like the airline price wars."

But Frank Dodge, president of Natick, Mass.-based applications vendor McCormack & Dodge Corp., says there is real danger involved in price cutting.

"Last year it was heavier than I have ever seen before. It has not accelerated in 1986, but it has not really drawn back either. There will definitely be long-term consequences for the vendors that cut prices. In that sense, users are short-sighted to push for cuts. But it is hard, especially in a fairly tight economy, to get them to take a longer term view."

Different perspective

Speidel's Lukowicz has a slightly different perspective on the issue. "Users aren't wrong to push for cuts when you consider the overblown prices for products. Vendors overstate prices; they factor price cutting into their pricing schemes. That has to be true because everyone is cutting. The users who really lose out are those who are in a noncompetitive situation. Without any competition, the vendor doesn't have to cut prices, and it ends up with windfall profits."

Lowry agrees that such selective price cutting is unfair to users. "The result is that you have customers, who paid full price, supporting those who have received big discounts."

What will be the ultimate outcome of the price cutting issue? Says Lukowicz, "If a big enough vendor takes a firm stand, aggressively prices its products and sticks to those prices, it could probably stop the price cutting wheels from turning. But if it continues, and I expect it will, there will soon be only a few giants left developing and supporting software."

Tool tracks bank accounts

By Eddy Goldberg

PHILADELPHIA — Corporate Data Systems recently unveiled Bankwide, an integrated banking deposit system. The product enables banks to obtain a composite view of a customer's different types of deposit accounts.

Bankwide is integrated through a single relational data base management system, Software AG of North America's Adabase. W. Cabot Knowlton, director of marketing at Corporate Data Systems, said this is a fundamental strength of Bankwide, which has been in development for five years.

Bankwide uses Software AG's fourth-generation language, Adabase Natural, to provide users with access to a customer's deposit information.

Targeted at mid-size banks

Bankwide is targeted at mid-size banks, Knowlton said. It operates on IBM 4341 mainframes and higher running under either IBM DOS/VSE or MVS using CICS as the teleprocessing monitor. The system is designed to operate in a real-time, batch or combination real-time/batch mode.

However, Richard Miller, editor of *Banker's Monthly* magazine, said that there is a limited market for such a product. Although he acknowledged that there is a real need for a product like this, he said that many bank customers only have a single checking or savings account.

The $450,000 price tag also limits the market, Miller said. "I think there is a need for a product like this for a number of banks. Maybe $1 billion to $10 billion banks would be interested. I don't think a $100 million bank would want it. For a $500 million bank, it would have to be proven carefully how it would pay off."

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MICROCOMPUTERS

SMALL TALK
Eric Bender

Design choices for developers

As always, commercial and in-house application software developers are grappling with some basic architectural questions. Here's the current favorite, posed last month by Microsoft Corp. Chairman William Gates: "In an upward-compatible environment, should every application write to the least common denominator?"

The response to that question, which defines the standard IBM Personal Computer as least common denominator, will establish the boundaries of mainstream end-user software during the next several years.

Because Intel Corp.'s 80286 chip was not designed to switch back and forth between real and protected modes, development of an appropriate version of Microsoft's MS-DOS has seen "a delay, on the order of a year more than you would have expected," Gates acknowledged. "To confuse matters further, we've begun talking about the 80386.

"The 80286 was done very well, but it was designed as PCs were taking off," Gates pointed out. Intel built the 80386 with a careful eye on that huge base of PC software. "The 80386 does a very good job of allowing us to migrate our software; you won't see the same delay."

As IBM Personal Computer AT-class machines replace Personal Computers, "I don't look at it as a break point, but a point of transition," said Robert Carberry, vice-president for program development and operations at IBM's En-

See **DESIGN** page 46

Bender is Computerworld's senior editor, microcomputers.

Aldus to unwrap upgraded Pagemaker for Mac, IBM

By Peggy Watt

SEATTLE — Aldus Corp. will release two versions of its Pagemaker desktop electronic publishing program in the coming months: an upgrade to its current Apple Computer, Inc. Macintosh program and a similar version for IBM Personal Computers and compatible systems.

Aldus President Paul Brainerd would say only that an Microsoft Corp. MS-DOS version of Pagemaker will be out "later in 1986" but added that it will offer an easy-to-use interface similar to the Macintosh version, including use of a mouse. Brainerd said the product will communicate with major laser printers.

Although Apple touts its Macintosh as the desktop publishing system of choice, Brainerd said he expects that the MS-DOS version of Pagemaker will reach a market as large or larger.

> ***The MS-DOS version of Pagemaker is expected to reach a market as large or larger than that of the Apple Mac.***

"Apple has the product to support the graphics that desktop publishing needs," he said, "But their advantage won't last forever because the IBM PC is getting some of those same elements," including window environments, graphical interfaces and alternate input through a mouse.

Brainerd said the Macintosh is suited to small and medium-size businesses, but the MS-DOS version of Pagemaker will bring desktop publishing into large, IBM-heavy firms.

He said Aldus has heard from large companies that are eager for the MS-DOS Pagemaker. "Clearly, this application is selling a lot of computers." He said the price will be roughly the same as the Macintosh version, which retails for $495.

Pagemaker for MS-DOS systems will run

See **PAGEMAKER** page 45

Hayes Smartcom II version lets PC Network share modems, ports

By James A. Martin

NORCROSS, Ga. — Hayes Microcomputer Products, Inc. has announced a version of its Smartcom II microcomputer communications software that allows IBM Personal Computers on the IBM PC Network to share modems and asynchronous communications ports.

Smartcom II for the PC Network is compatible with PC-DOS 3.1 and the Netbios interface. It is said to offer familiar Smartcom II functions such as file transfer, data base access and dial-up asynchronous terminal emulation. The program enables a networked IBM Personal Computer XT or AT with a modem to function as a modem server, allowing the end user to operate other programs simultaneously. Available now, the PC Network version sells for $599.

"This product provides the same user interface for PC Network users that Smartcom II has provided for single-user PCs," according to President Dennis Hayes.

Smartcom for the PC Network offers Hayes and Xmodem error-correction protocols to ensure accurate data transmission and also provides remote access with password protection. The software permits PCs to emulate VT52, VT100, VT102 or Televideo System, Inc. terminals.

INSIDE

Quadram accelerator card offers Intel 80286-style speed/**44**

Upgraded Microsoft Lisp offers twice as many primitives and Common Lisp support/**44**

NEW THIS WEEK

- DEC introduces two versions of Dectalk
- For more on this and other new products, see pp. 87-115.

INSTANT ANALYSIS

"In many ways, the tools in PCs are not as good as the fourth-generation languages. But in the next few years we will not only catch up, we will go beyond."

— William Gates, chairman of Microsoft Corp.

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Quadram unveils accelerator card

Micros get high speed of PC AT

By Eddy Goldberg

NORCROSS, Ga. — Quadram Co. has announced Supersprint, a $695 accelerator card that the company claims will allow Intel Corp. 8088-based microcomputers such as the IBM Personal Computer XT to operate with the speed of 80286-based machines such as the IBM Personal Computer AT.

According to Venkat Mohan, general manager of Quadram's Board Products Division, Quadram has "squeezed out the last ounce of performance from a standard 8086 chip."

Quadram is able to achieve this through a new form of cache memory called Image Memory, which "works like a mirror," said Jim Lindenmayer, technical support manager.

> ***'The card shows an exact image of what's in the first 96K bytes of system memory — interrupt vectors, Basic loads and program loads.'***
>
> — Jim Lindenmayer
> Quadram Co.

'An exact image'

"The card shows an exact image of what's in the first 96K bytes of system memory — interrupt vectors, Basic loads and program loads," Lindenmayer said.

Copying that first 96K bytes of random-access memory onto the accelerator board increases the speed because there is no need to go through the bus to standard internal memory to access those functions, he said.

Mohan said the card will appeal to the growing number of retrofit buyers who wish to preserve their investment yet expand their computing power, engineers and users of large spreadsheets, for example.

Likely to drive down price

Lindenmayer predicted that Supersprint is likely to drive down the price on 80286-based accelerator cards, which he said run from approximately $1,200 to $2,000 today.

The price and buying cycle for 80286-based machines could also be affected, according to Lindenmayer, because the Supersprint accelerator card represents a cost-effective way to extend the life of the IBM Personal Computer XT and compatible 8088-based microcomputers.

Supersprint is said to be fully compatible with the Lotus/Intel/Microsoft Expanded Memory Specification.

Supports math coprocessor

The product supports an 8087 math coprocessor through an open socket, the vendor said.

The accelerator card reportedly comes in a standard package with 32K bytes of standard cache memory and 96K bytes of Quadram's Image Memory.

Designed for the IBM Personal Computer XT and 8088-based compatibles, it is said to take up one expansion slot and is scheduled to be available in the second quarter of 1986.

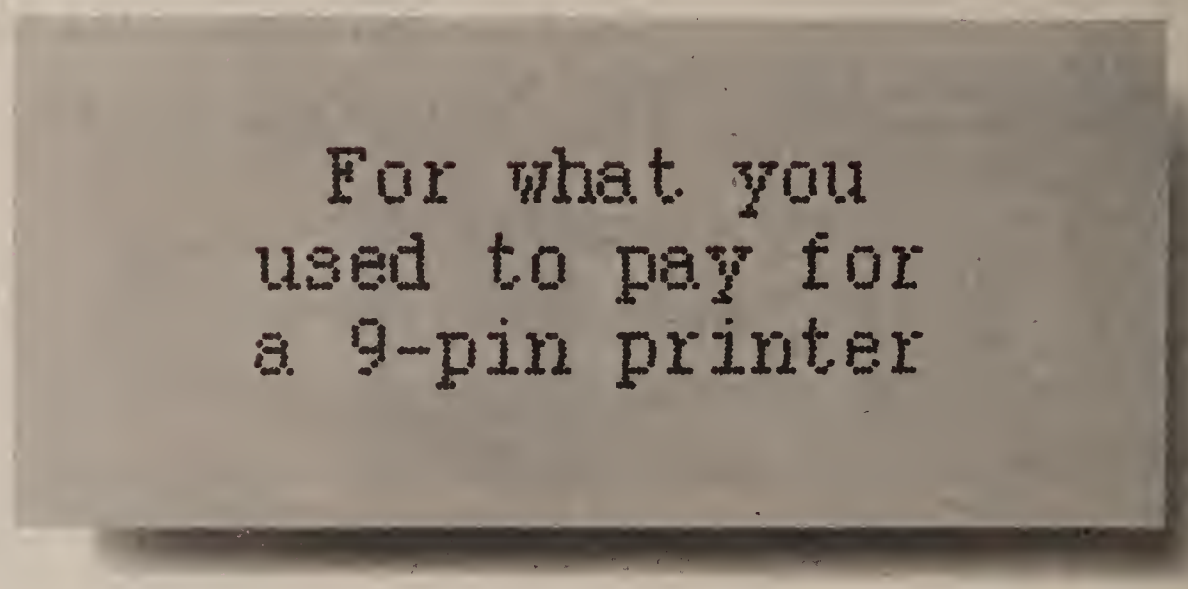
Microsoft introduces

BELLEVUE, Wash. — A new release of Microsoft LISP, intended for delivery of expert system and other artificial intelligence applications, is available from Microsoft Corp. Priced at $250, Version 5.1 runs on personal computers using MS-DOS or PC-DOS 2 or higher.

The product is the latest update of the Mulisp software developed by Soft Warehouse, Inc. of Honolulu, and marketed by Microsoft. A compiler is available separately through Soft Warehouse for $150.

Enhancements over the previous release, 4.11, include twice as many primitives for faster program execution; twice the capacity of Version 4.11, allowing devel-

PRINTERS'



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enhanced LISP for MS-DOS, PC-DOS microcomputers

opment of application programs up to 8,000 lines that use up to 512K bytes of memory; Common LISP support, with more than 400 Common LISP functions, special forms, macro and control variables; expanded arithmetic capabilities; a symbolic debugger; faster list sorting as well as split-screen capabilities.

According to Don Colton, program manager at Microsoft, the LISP version is intended to develop applications on microcomputers for use on microcomputers.

"The product is ideal for taking a LISP application and putting it on a stockbroker's or lawyer's desk, for example," Colton explained. "It runs on a garden-variety personal computer."

He said that Microsoft LISP is optimized to run on IBM Personal Computer XT-class machines with 256K to 512K bytes of memory. "We have been able to combine a very tight code structure with very fast code."

Colton contrasted this with Golden Common LISP from Gold Hill Computers, Inc., which he said is targeted more at IBM Personal Computer AT-class machines and XT-type machines with expanded memory.

On-line, interactive tutorial

Microsoft LISP Release 5.1 comes with an on-line, interactive LISP tutorial program as well as demonstration programs that provide working examples of artificial intelligence software.

Version 5.1 requires a minimum 128K bytes of memory (Microsoft recommends at least 256K) and one disk drive (Microsoft recommends two).

It is now available at all Microsoft retail outlets. Upgrades for owners of previous versions are $100.

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NEC

Pagemaker unwrapped

From page 43

under Microsoft's Windows operating environment, though it will not require Windows.

"Windows, despite a painful birth, holds much promise," Brainerd said. "We've got to stick to some standards. Windows offers a great opportunity to do that, with this graphics interface. The core of the market is consistency for the user."

The MS-DOS version of Pagemaker will interface with as many laser printers as possible, many of them through Adobe Systems' Postscript communications program, Brainerd said.

Downloading fonts as bit maps

Pagemaker will still support Hewlett-Packard Co.'s Laserjet printers by downloading fonts as bit maps. The product will also support less versatile dot matrix printers, the vendor said.

Version 1.2 of Pagemaker for the Macintosh is scheduled to ship this month, Brainerd said. It supports Postscript's new typefaces and Apple's new Laserwriter Plus.

Current registered Pagemaker customers will receive the upgrade free of charge, according to Aldus.

Aldus said it has been in touch with several typesetter manufacturers that want to ensure that their systems will interface with microcomputer publishing software.

"A large portion of them have not been as observant as they should be in basic technology," said Brainerd, whose electronic publishing experience stems from four years in product management at electronic typesetting/publishing systems for Atex, Inc.

"The better commercial typographers are taking steps to participate, including some traditional typesetting companies that see a chance to expand their business," according to Brainerd.

The neighborhood print shop, however, "may be oblivious," he added.

Design choices for developers

From page 43

try Systems Division.

Carberry added, however, that "I can't think of a greater challenge than moving from the 8088 to the 80286."

Topview version may not suit vanilla PC

He also commented that it is not clear whether the upcoming graphics-based version of IBM's Topview will be suitable for the vanilla PC. IBM will develop the capability and then see where it fits.

Another well-seasoned question for software authors is whether to build in hooks to Microsoft Windows or Topview or ignore operating environments for the time being. The second two options are getting difficult, as Microsoft is pressuring developers into writing for Windows by threatening incompatibility with future versions of MS-DOS.

Naturally enough, Microsoft is fully committed to Windows for its own upcoming applications. (One, Gates remarked cryptically, is "a new category of integrator" that uses different "encapsulation procedures.")

But others continue to hedge their bets.

Lotus Development Corp. won't introduce any Windows-tailored packages this year, and "the question of porting existing products remains an open one," said Lotus Chairman Mitchell Kapor.

"There are two sets of pressures: consistency and better ability to handle complexity," Kapor said. However, in some cases a Windows-style environment doesn't buy you much. "Putting up more than two spreadsheets in windows, [the screen] starts looking pretty horrible, and people don't do that," he commented.

Despite these never-ending uncertainties, vendors and data processing shops keep busily plugging away at new types of applications. Among the most promising, according to Kapor, are programs addressing group productivity, organization and messaging.

Lotus also continues the big push into better programming tools for spreadsheets.

The future battle for spreadsheets will not involve "who can make the biggest one but who can make a better programming environment," said Jerrold Kaplan, Lotus' principal technologist.

"People say, 'I don't program, I spend all day building models with spreadsheets,' " Kaplan noted wryly. "They complain that spreadsheets are hard to build, hard to debug, hard to document and hard to maintain. These aren't new complaints."

> ***'People say, "I don't program, I spend all day building models with spreadsheets." They complain that spreadsheets are hard to build, hard to debug, hard to document and hard to maintain. These aren't new complaints.'***
>
> — Jerrold Kaplan
> Lotus

Trend toward high-level languages

Lotus and the company's competitors are moving toward higher level programming languages with better debugging features, he remarked, noting that Javelin Software Corp.'s Javelin package is one example of the trend toward high-level declarative languages.

In future Lotus products, "the ability to discern errors will be the biggest single benefit," according to Kaplan. The software will be better able to handle two nagging spreadsheet questions: "First, 'Is it correct?' And second, 'How sure are you of these figures?' "

Another development trend is to build in "much more knowledge about the potential application," according to Kaplan. Then, for example, the software would study the application and identify possible errors, working much like a syntax checker.

User interface to remain the same

Despite these changes, the software will not necessarily show "a dramatic change at the user interface," Kaplan suggested. "It will probably look very much like it looks now."

At this stage, the upcoming software is not being tuned so much for 80286- or 80386-based machines as for an environment with a large address space, graphics display, a multitasking operating system and a hard disk drive, Kaplan said.

As one would expect, all these ambitious projects will take considerable time.

Quizzed recently on the acquisition of Software Arts, Inc. assets a year ago, Lotus President Jim Manzi pointed to development-stage software running on an IBM PC behind his desk.

"This is a product that was partially developed at Software Arts," Manzi said. "That's what the real interest in the company was. . . . And it is not something you'll be hearing a lot about in the near future."

Design refinements cut size, cost and power consumption for 4800bps modems

Additional LSI microminiaturization in UDS' 208A/B modems has produced significant performance improvements, along with dramatic reductions in size and power consumption. The 208A/B can be strapped as either full-duplex, four-wire (half-duplex, two-wire) over dedicated lines or half-duplex on the dial-up telephone network. It is now available in the "minibox" package. The result: a 54% reduction in volume. The 208A/B is also available in space-saving OEM card configurations.

DC power consumption has been reduced to approximately 2W. Other performance improvements include:

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COMMUNICATIONS

WIRE TAP
Walter Ulrich

Liberty from legal limbo

Passage of the Electronics Communications Act, which has been introduced for congressional action during 1986, could free data communications from the legal limbo it has been in for over a decade. This column reviews the current dilemma, describes the pending legislation and discusses its impact on electronic communications.

Currently, data communications carried by private carriers over satellite may have no legal protection whatsoever from eavesdroppers, while other kinds of digital communications are in a legal twilight zone. Title III of the Omnibus Crime Control and Safe Street Acts offers protection only to voice-based and wire communications handled by common carriers. Postal laws apply only to mail in its corporeal form and only from the time it is deposited in a postal mailbox until it has been received by the addressee. Data communications falls outside the jurisdiction of both sets of laws.

The proposed Electronic Communications Act extends to electronic communications the same kind of legal safeguards afforded to voice communications. It accomplishes this in five ways:

• It safeguards all electronic communications, regardless of transmission medium or form of the message. The act applies to digital voice, file transfer, electronic mail and video images. Satellite and microwave transmissions have the same legal standing as wire communications.

See **GAINING** page 54

Ulrich is president of Walter Ulrich Consulting in Houston.

Replacing a homespun net

Service bureau installs cost-effective X.25 system

By Elisabeth Horwitt

DALLAS — Mtech, a $180 million Dallas-based service bureau, has spent the last two years converting from a homegrown communications network that used outdated equipment and internally developed protocols to a more cost-effective system using the CCITT X.25 communications standard.

A subsidiary of Mcorp, a $22 billion financial company in Dallas, Mtech serves approximately 1,300 financial institutions around the country. For many of its clients, the service bureau performs all the functions of an in-house data processing department. Mtech develops and runs its customers' on-line applications on a variety of hosts from IBM, Honeywell, Inc., Burroughs Corp., NCR Corp. and Tandem Computers, Inc. at 40 data centers in 20 states. It also operates an electronic funds transfer network — which it plans to expand into 18 more states — in Texas and Oklahoma.

Mtech's old, internally developed network linked the data centers together and linked customer sites to data center facilities. Although leased lines predominated, the network also also used fiber optics, digital radio and dial-up connections.

Two years ago, Mtech decided that it needed a new network. "We have aggressive expansion plans," explained Mtech Executive Vice-President of marketing Robert Heckman. "We hope to serve 2,000 financial institutions by 1990. And we plan to become a national company. Five years ago we were only in two states. Now we are in 20 states and negotiating to be in five or six more by the end of this year." Another major factor is the service bureau's recent decision to start offering automatic teller machine networking services in the near future.

"We concluded that we just could not carry out our telecommunications strategy

See **REPLACING** page 53

AI integration gets a shot in the arm as vendors link products

By Elisabeth Horwitt

Several announcements during the past two weeks have moved artificial intelligence and conventional computing environments a few degrees closer to true integration.

Two weeks ago, Symbolics, Inc. announced the SNA Facility, a hardware and software link that enables the vendor's 3600 series of artificial intelligence systems to exchange data with IBM mainframes [CW, March 10].

Four days later, start-up company Flavors Technology, Inc. brought out a high-speed bus-to-bus link between Lisp Machine, Inc. systems and Gould, Inc. superminicomputers.

And last week, Texas Instruments, Inc. announced plans to integrate the Explorer AI system with the communications environments of workstation vendors Sun Microsystems, Inc. and Apollo Computer, Inc.

"I look at the recent announcements as yet another acknowledgement by symbolic processing vendors that they have to coexist with other architectures and that conventional 32-bit workstations are becoming delivery systems for AI applications," says Susan Messenheimer, president of Natick, Mass., market research firm Aim Publications, Inc.

Flavors' recently announced Bus-link, priced at $36,000, is a 32-bit wide asynchronous link that permits either a TI Explorer or a Lisp Machine Lambda to access a Gould minicomputer in real time.

According to David Carleton, manager of Lisp Machine's aerospace division, Lisp Machine equipment already incorporates a

See **AI** page 52

INSIDE

The MA-23DR LAN Extender from M/A-Com Associates extends local-area networks' range across a 10-mile microwave link/**48**

NEW THIS WEEK

- Integrated Marketing offers the Data Manager multiple device spooler
- For more on this and other new products, see pp. 87-115.

INSTANT ANALYSIS

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— Harvey Newquist III, editor of the "AI Trends" newsletter

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LAN Extender stretches local-area nets via microwave link

Handles 20M bit/sec. bulk data capacity

By Stanley Gibson

BURLINGTON, Mass. — Offering an alternative to coaxial or fiber-optic local-area network links between buildings, M/A-Com Associates, Inc. recently announced a product that will stretch a local-area network 10 miles via a microwave link handling 20M bit/sec. bulk data capacity in the 23-GHz band.

The MA-23 LAN Extender is priced from $35,000 for complete systems, including two terminals and installation, and is fully compatible with other M/A-Com 23-GHz systems, according to M/A-Com.

The product should be particularly attractive to corporate customers who cannot easily run coaxial or fiber-optic cable between buildings to extend a local-area network, according to Doug Cogswell, a marketing manager at M/A-Com. "The electronics are not that different between fiber-optic and microwave links. Installation is the difference," he said, indicating a customer would probably choose the less expensive alternative.

"Something that would transmit the full bandwidth of Ethernet would be very attractive," said Clarence Henderson, engineering section manager for GTE Government Systems Corp. in Mountain View, Calif.

Linking local-area nets in buildings

Henderson said GTE has implemented cable-based LAN Extenders to connect the local-area networks in the different buildings on the campus of GTE's Government Systems facility. He added that he would be interested in considering a microwave link such as that offered by M/A-Com and said the $35,000 starting price is not prohibitive.

The link is designed to work with token-ring networks meeting the IEEE 802.5 standard, including Proteon, Inc.'s Pronet 10, and networks compatible with the IEEE 802.4 token-bus standard. According to Proteon Marketing Manager Tony Bolton, the network vendor will officially announce a joint marketing agreement for the MA-23 LAN Extender with M/A-Com on March 24.

The product also works with IEEE 802.3 Ethernet-compatible systems that use the Transmission Control Protocol/Internet Protocol through the addition of standard gateways at the end of each link. The LAN Extender's use of the token-ring protocol to connect nodes eliminates delay problems that would otherwise occur using Ethernet over distances of greater than 1,500 meters, according to Cogswell. Delays are buffered at the gateway, allowing fully transparent transmission between Ethernet networks at 10M bit/sec., he added.

> ***'The electronics are not that different between fiber-optic and microwave links. Installation is the difference.'***
>
> — Doug Cogswell
> M/A-Com Associates, Inc.

Most available local-area network products cannot match MA-23 LAN Extender's 20M bit/sec. data rate. Proteon's Pronet 80 product transmits at 80M bit/sec.; however, it will not work with the LAN Extender, Cogswell said.

Microwave nodes are required at distances of not more than 10 miles, and several nodes can be strung together, enabling the link to extend indefinitely, at least in theory, according to Cogswell. The MA-23 LAN Extender also provides for network partitioning if the local microwave receiver falls below threshold or the data traffic across a link or a series of links should cease. Either way, the microwave link will drop out of the system and will return data on both ends as if the microwave link were not there. Data transmission will be restored automatically when above threshold performance is restored. This feature enables networks to continue to operate even if the microwave connection is interrupted, Cogswell explained.

Paul Schaller of Vitalink Communications Corp., a maker of link-level network bridges, said he is familiar with LAN Extender, having worked at M/A-Com. "It's an outstanding product. They are going to do quite well with it," Schaller predicted.

Gateways between the LAN Extender and Digital Equipment Corp. Decnet networks will be available in 180 days, and extended network service gateways will be available in 90 to 180 days, according to Cogswell. An IBM 802.5 Token-Ring network requires no gateways, Cogswell said.

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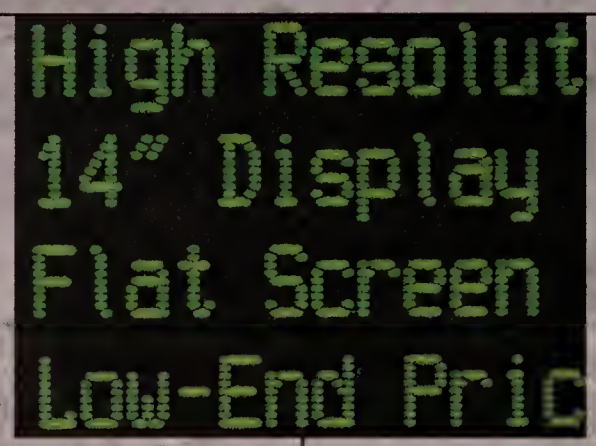

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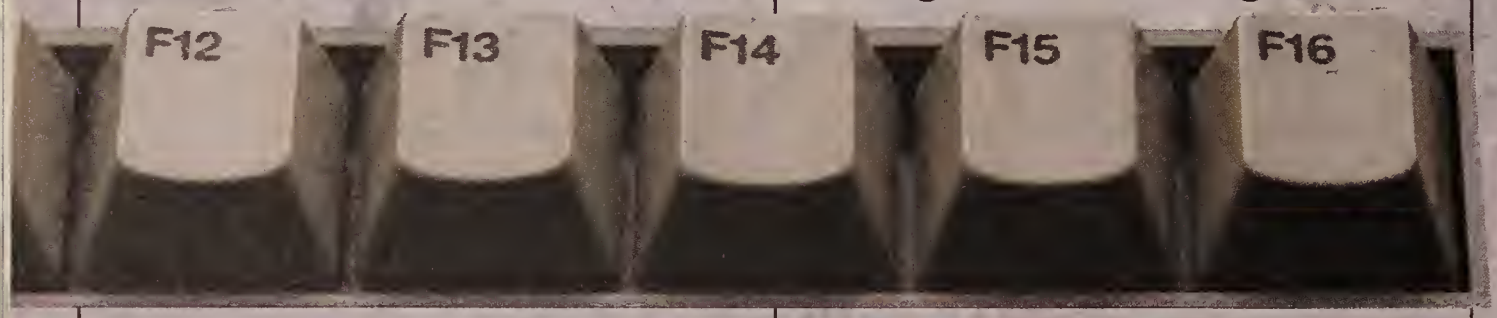

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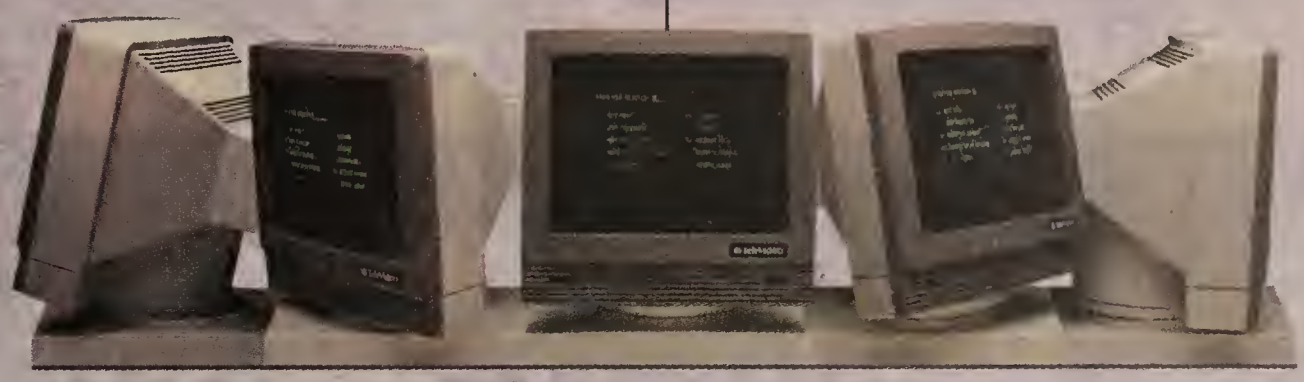

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COMMUNICATIONS

AI gets closer to integration

From page 47

Motorola, Inc. 68010 coprocessor. "You can use data generated by, say, a Unix engineering application to fire rules [decide which rules to apply next] within your expert system. The Flavors product allows us to replace the resident Unix system with a separate Gould computer and still retain the real-time connection."

Harvey Newquist III, editor of "AI Trends," a newsletter published by Scottsdale, Ariz., consulting company DM Data Co., considers Bus-link "a good but limited idea. Gould and Lisp Machine are not exactly your mainstream players."

Newquist adds that the link would only capture the limited real-time expert systems market.

Flavors spokesman Neil Parmenter cites three potential real-time AI markets: government/military applications, such as satellite surveillance; simulation and modeling; and process control.

TI-Apollo alliance advantages

The fruits of the TI-Apollo alliance will be made available in three stages, according to Lou Reynolds, Apollo's manager of strategic marketing and business development.

The initial product, which should be available within six months, will enable TI Explorers on Ethernet to share data and programs with Apollo workstations on the Domain network via Apollo's Etherbridge. Reynolds admits that, unlike the token-passing Domain, the Ethernet segment will be susceptible to traffic bottlenecks.

The TI-Apollo alliance next plans to ensure compatibility between the Apollo and TI versions of LISP so that Apollo workstations can become delivery systems for AI applications.

"Companies like General Motors Corp., Lockheed Corp. and Boeing Co. are building expert systems that they will want to deliver to their users, many of whom have Apollo computers," Reynolds says.

The alliance's two-year goal is to install on Apollo systems the symbolic processing chip currently under development at TI. Symbolics reportedly is working on a similar chip. "The chip will allow integration across a backplane rather than a network," Reynolds says.

He adds that the addition of an AI coprocessor would facilitate the development of natural language and expert system front ends on Apollo computers.

Support for Sun's NFS

TI also announced support for Network File System (NFS), a proposed communications standard set forth by Sun.

NFS implementation will enable Explorers to access data bases residing on the approximately 25 Unix-based workstations and file servers that also support the standard.

According to Newquist, TI, by expanding its ties with conventional workstations, gains not only more popularity but also new competitors.

"Apollo and Sun workstations already have some symbolic processing capabilities, and they want new markets because they feel threatened — by each other and by IBM's RT Personal Computer. Everybody is getting into bed with each other now, but what they really want to do is cannibalize each other's territories," Newquist maintains.

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COMMUNICATIONS

Replacing a homespun net

From page 47

for the next five-plus years on the old system," Heckman said. "Mtech designed and implemented that network about 17 years ago when the company started, and it has been growing ever since."

Mtech's complaints against the old network are manifold. First, the company found it difficult or impossible to monitor and maintain the network and to measure its performance. Second, the network's multiple single points of failure made it unreliable. Third, protocol and application functions were embedded in the network, making it difficult to update either the hardware or the software. And the fact that the system conformed to no industry standard made adaption to Mtech's growing communications requirements "a never-ending task," according to Heckman.

Furthermore, much of the existing hardware was obsolete and no longer available, which meant that every time something failed, it had to be replaced by a different type of product.

Mtech hired Paul Bell, president of a New York consulting service, The 23K Group, Inc., to evaluate options for a new network in terms of four basic criteria: cost of installation, flexibility, speed and expandability. Bell recommended that Mtech replace its old network with an CCITT X.25 system, citing the following potential paybacks:

- Maximum utilization of human, line, switch and application resources through the use of time division multiplexing technology.
- Maximum interconnection flexibility.
- Fault tolerance through the implementation of line and switch redundancy and alternative routing.
- Access to X.25-compatible public data networks that could be used to link new customer sites whose data traffic levels are not yet high enough to cost-justify a private line.
- Connections with banking services and ATM networks, many of which support or plan to support X.25.
- A migration path to wideband services such as T1 links.
- Implementation of a variety of X.25-compatible network monitoring and control devices.
- Significant reductions in operation support requirements.

Bell did a year's in-depth study before recommending a packet-switching system vendor to Mtech.

Bell's final choice was Amnet, Inc., a 4-year-old company that began marketing the Nucleus 6000 packet-switching system in December 1984. Bell claims that the product is one of the few truly modern X.25-compatible packet switches available today.

Bell also cited as a plus the Nucleus 6000's modular architecture based on multiple Intel Corp. 80286 CPUs. The entry-level system, which starts at less than $100,000, can handle data traffic generated by a typical IBM mainframe network.

"The average IBM CPU processes about 100 to 200 packet/sec. or about 10 transaction/sec.," said Amnet President and Chief Executive Officer Robert A. Degan, "so we started our product line at that level." When data traffic increases past the switch's current capacity, it can be upgraded by adding another 80286 board.

"That's why it's cost-effective," Bell added. "You can justify the low-end product with a small amount of network traffic, then add boards as the traffic grows. You can increase network capacity tenfold without having to discard the original system."

Amnet's modular network management system is another advantage, according to Bell. The entry-level product starts at $50,000, and it, too, can be upgraded by adding processor modules.

Amnet recently performed a cost-justification study that compared the projected two-year cost of a point-to-point connection based on ordinary 9.6K bit/sec. leased lines with and

See **REPLACING** page 54

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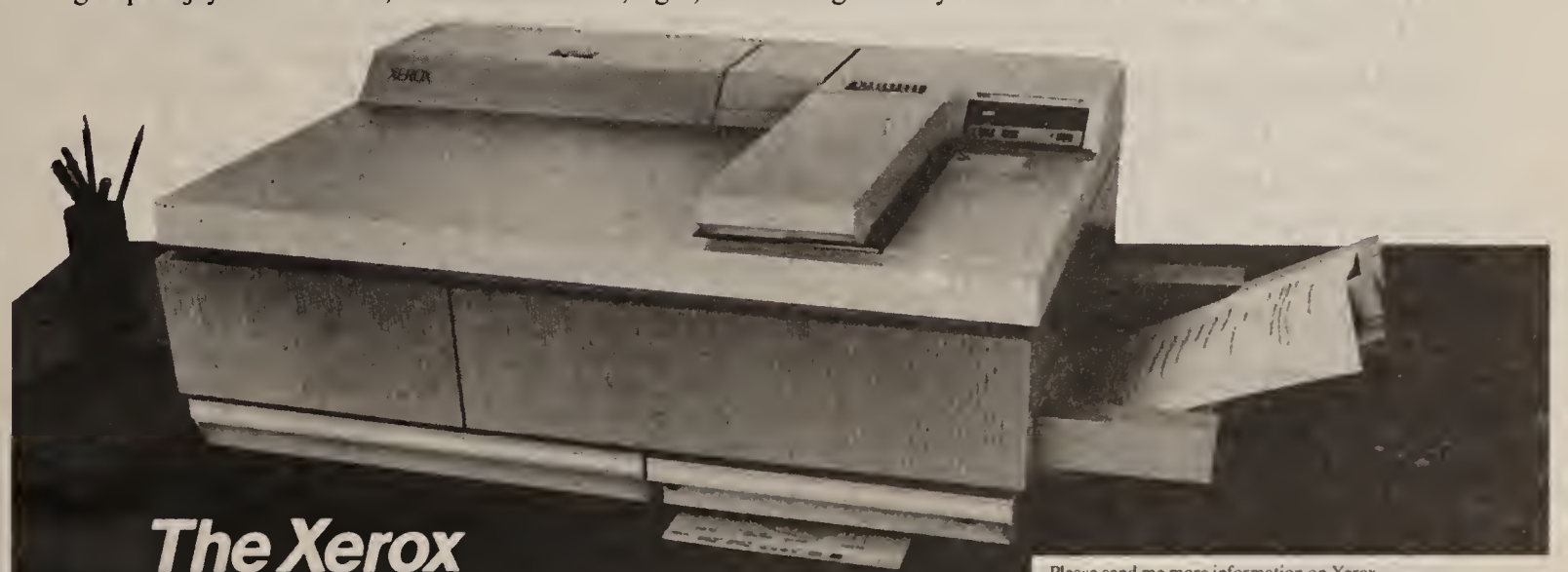

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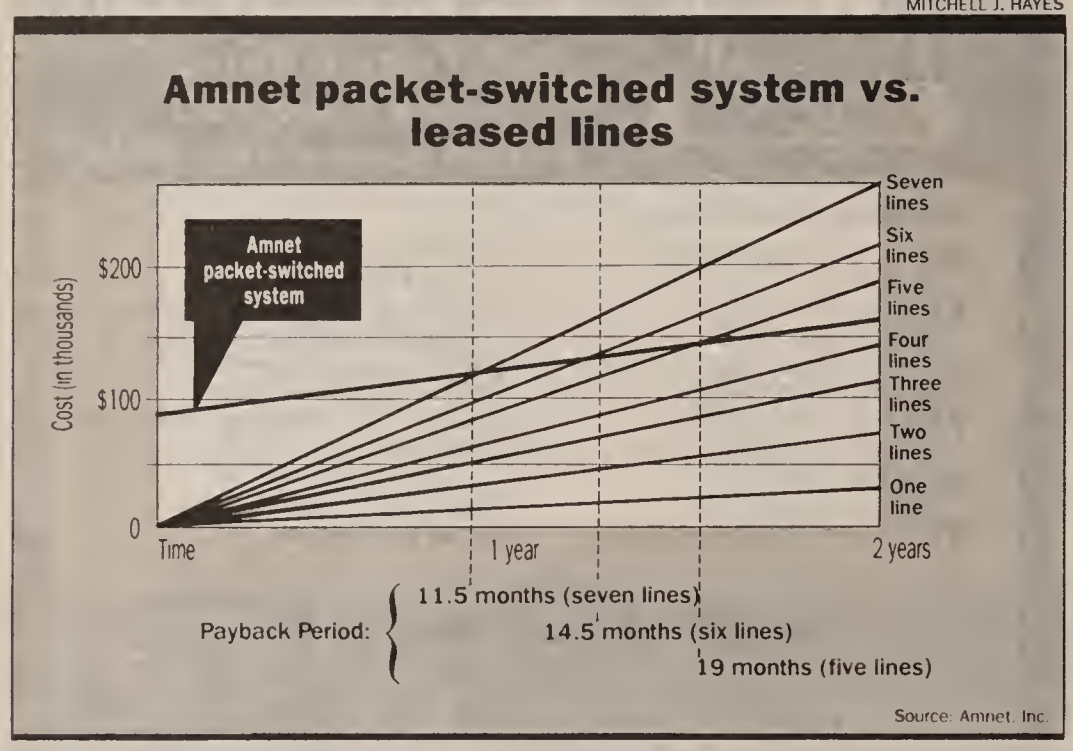

Replacing a homespun net

From page 53

without a Nucleus 6000 packet-switching system (see diagram left). The study's figures are based on an actual link between a cluster of ATMs in Wilmington, Del., and an Mtech data center in Dallas.

Projected expenses for the Nucleus 6000 installation include up-front costs of approximately $90,000, which is the price of a typical entry-level system. The Amnet installation's expenses over the next two years comprise the cost of leasing two private lines and two modems.

While the non-packet-switched leased line installations depicted in the diagram have no up-front costs, the line and equipment leasing costs over time increase as the company's data traffic needs increase. Amnet spokesman Peter Thornton said packet-switched technology enables the Nucleus 6000 configuration to support the same amount of data traffic as four to 10 ordinary 9.6K bit/sec. leased lines. As the diagram indicates, the greater the user's data communications needs, the less time it takes for the Nucleus 6000 installation to start saving money over a comparable leased line installation.

Mtech has allocated a budget of $5 million for installing the network in the next three years. The initial network, completed approximately eight months ago, links just three nodes. Mtech said it expects to recoup its initial investment in approximately 2½ years.

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Available in Non-IBM PCs	*Yes*	*No*
Upgrades For Existing PCs	*Yes*	*No*
Internal Tape Back-up Available	*Yes*	*No*
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Slots Available (3270 PC, APA)	*4*	*2*

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Gaining liberty from legal limbo

From page 47

• It eliminates the distinction between common and private carriers. In 1968, private carriers just did not exist. In the Second Computer Inquiry, the Federal Communications Commission deregulated most communications. Existing legislation offers privacy protection only to messages carried via tariffed communications common carriers. Clearly, the same level of privacy protection is required for all communications carriers, common or not.

• It establishes both criminal and civil penalties for persons who tap electronic communications systems without proper authorization. The criminal penalties are similar to the ones applied to individuals who bug telephone voice calls. The civil penalties make it possible for individuals or corporations to recover actual, statutory and punitive damages caused by such illegal access or by the illegal alteration of information.

• It clarifies and gives legal standing to current guidelines applying to electronic communications stored in digital format. Without this legislation, service providers lack clear grounds to withhold stored information from the U.S. government, law enforcement agencies and other third parties.

• It requires law enforcement agencies to meet the same standard of proof and go through the same procedures of taping digital communications as are required with voice communications. Unwarranted governmental intrusions are prohibited.

Privacy legislation is not a panacea. It does not substitute for technical security measures such as password protection and encryption. Communications managers need to remain vigilant and to maintain and improve security processes and procedures even when the act is in effect.

Nonetheless, the act promises to have a substantial impact on communications privacy. Those who violate such privacy by electronic means can be punished. Some potential perpetrators will be deterred by the clarity and firmness of this legislation. Honest businesses will have legal guidelines to follow. The bill clearly deserves support.

Executive Report

ILLUSTRATION BY KAREN WATSON

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Managing voice/data communications

A lot of looking, not much integrating

By GLENN RIFKIN

The point at which a few coincidences become a trend and a trend becomes an accepted standard operating procedure is often hazy. In the world of MIS, managers confront the challenge of differentiating fiction from fad and fad from fact. The confusion is aided by vociferous vendors, eager consultants and a zealous press seeking pegs for every hat.

So it is with the merging of voice and data communications. Though there is general agreement that these once diverse functions are inevitably moving toward each other, the jury is still out as to how far the alleged trend has actually progressed and, indeed, whether it is a desirable integration in the first place.

What is clear is that organizations that pushed telecommunications and DP together did so with a plethora of personnel problems to solve and technical obstacles to overcome.

"The two functions are basically diametrically opposed," says Kevin Shannon, manager of telecommunications for General Electric Co. in Syracuse, N.Y.

The resulting turf battles and conflict between diverse technological cultures mount while corporations seek the rare, qualified individuals capable of managing this complex merger.

The breakup of AT&T added immeasurably to the confusion and continues to wreak havoc with the Excedrin and Sominex budgets in MIS shops. Hundreds of vendors pour forth confusing signals to the often unprepared telecommunications world.

As one telecommunications manager puts it, "It's not that there are so many more problems now, it's just that the blame can go in so many directions."

The key issue is a management one. As Fortune 500 companies explore the merger of their telecommunications and MIS departments, yet another responsibility is added to the MIS executive's already crowded agenda.

Managing these combined functions takes an understanding of not only voice and data but also of how these two disciplines merged will affect the business.

Managing these combined functions takes a considerable understanding of not only voice and data communications individually but also of how these two disciplines merged will affect each other as well as the business.

The strategic and economic advantages of integrating voice and data networks are beyond doubt. The cost benefits tend to leverage off the size of the company. Economies of scale make investments into such technologies as very small

---

Rifkin is a Computerworld *senior editor.*

Managing voice and data communications

Continued from previous page
aperture terminals and T1 lines well worthwhile. As one consultant says, "The rich get richer here."

Though integrated voice/data workstations, the highly touted but unfulfilled promise of the early '80s, never made a lasting impression (see story page 64), the merging of networks is another story. The return on investment from integrated rather than diverse networks is apparent.

Savings on the data lines that pervade large organizations can be enormous when tied with the more flexible and ubiquitous voice networks, particularly the innovative private leased lines many top companies have installed.

But cost alone would not convince most companies to overhaul existing corporate structures and philosophies. In such hardball industries as banking, insurance, aerospace and electronics, the merging of the two functions promises a strategic edge. Companies such as Westinghouse Electric Corp., Wal-Mart Stores, Inc. and Federal Express Corp. have begun to invest heavily in satellite transmission facilities in order to create their own private, custom-designed communications networks.

According to Donald Gagnon, manager of telecommunications planning for the Northrop Corp. Aircraft Division in Hawthorne, Calif., the merger of voice and data is not a thing of the future; it is here today. Northrop's executives pushed for this strategy, and the company is currently bringing its telecom and MIS groups together.

"It's already happening," Gagnon says. "It sold here on the aspect that this company needs to get where it needs to be in order to be competitive in the 1990s. In the high-tech world of aerospace, we don't have a heck of a lot of choice."

At Marriott Corp. headquarters in Bethesda, Md., the two groups merged more than two years ago, and the results have proven extremely positive, according to Duane Heidel, vice-president of corporate telecommunications (see story this page). "Being together under information systems makes us much better because we are really able to support the business plan rather than being just telephone movers," Heidel says. "We are systems people. My people view themselves as systems people not telecom people."

Marriott's early success aside, the ability to merge and then manage voice and data within an organization continues to present problems for many who seek the promised benefits.

Consultants as well as users agree that each organization confronts a set of specific problems inherent to that business or industry while trying to merge and manage voice and data. How useful or successful that merger will be is likely to be dictated by the nature of the company's business. The corporate culture in a company manufacturing blue jeans and faced with short planning cycles differs significantly from a huge oil conglomerate with 10-year planning cycles.

Corporate structure also matters. Companies with heavily centralized MIS operations will exhibit very different technological philosophies from organizations with widely distributed MIS. "If you are working in a distributed corporate structure, then integrated systems across the entire corporation are not going to work," Frank declares, "because you will find yourself in endless political battles trying to take power away from the line managers."

Though there is no blanket solution, the list of considerations that transcend the individual corporation must be confronted before a successful joining can occur.

Among the issues are the following:

- Deciding whether the integration of voice and data is necessary in the first place and determining whether there is money to be saved by merging these functions.
- Finding and keeping a qualified, knowledgeable staff that understands and can function within an integrated environment.
- Finding the kind of professional who can show upper management the bottom-line value of integrated systems as it relates to the business function of the company.
- Propogating the belief throughout the corporation that the merging of voice and data adds a strategic advantage to the business.
- Training the communications professionals to think more in an applications, problem-solving mode than in a cost-per-connection framework.
- Training the data processing specialist to consider the economics of the system and not merely viewing everything in a hardware/software-at-any-cost frame of mind.
- Encouraging the corporation to think in terms of becoming its own telephone company, investing in a transmission plant of lines and switches that can be shared uniformly as a utility.
- Overcoming the political questions of who controls the network and who oversees the division of responsibilities within MIS.
- Managing by application rather than by technology. Attempting to avoid the shiny, new bells and whistles solutions to problems that do not exist in favor of getting to the heart of the problem and solution.
- Learning to cope in a multivendor environment ushered in by the AT&T divestiture.
- Keeping abreast of the constantly changing tariffs related to telecom services.

Prior to embarking on this integration of voice and data functions, the MIS manager must be sure that it is a path worth following. According to Howard Frank, a Washington, D.C.-based communications consultant, the benefits of pure integration — the combining of voice and data on a single system — are not necessarily obvious.

"It has become folklore now that integration is good and segregation is bad," Frank says. "We know that in terms of human beings that is true, but in terms of communications, it is not obvious at all."

Frank says he believes that many technical people run in "buzzword modes" and adopt the word "integration" as a given without considering what it actually can do and what it will take to achieve. "There is an almost religious belief that this is good. In fact, it may be that most or many corporations are not even ready for integration," he says.

According to Frank, the only real justification for integrated networks is the need for integrated applications — applications in which both voice and data are used simultaneously, such as in teleconferencing or a credit authorization system.

Frank is also not convinced that such integration is widespread. "I think it is happening less than you would think it is," he states. "The impression I get is that the senior executives don't know very much about

Continued on page 59

THE BENEFITS OF MERGING VOICE AND DATA

MITCHELL J. HAYES

Economic
For wide-area communications, there is money to be saved using integrated rather than diverse voice and data lines.

Competitive edge
With voice and data under MIS control, a company can better focus the use of technology as a corporate resource.

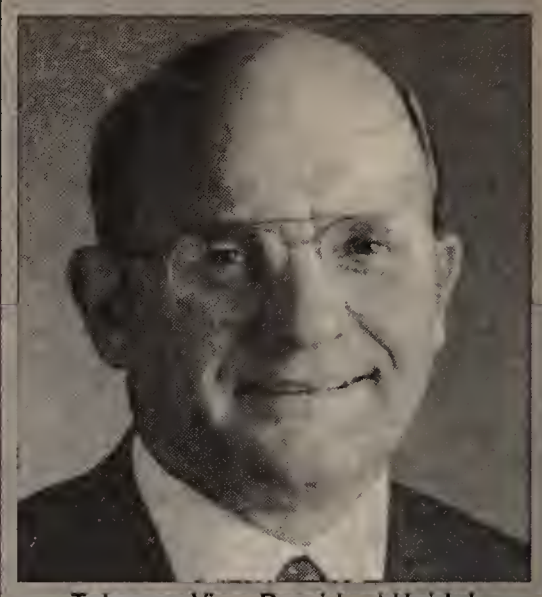
High visibility for MIS
By presenting a united image to the company, MIS gains added prestige and visibility.

Strategic planning
MIS can work more easily with end users to anticipate their long- and short-term telecommunications and data needs.

Education
Cross-training between voice and data professionals helps increase understanding of their respective technologies and capabilities and builds a stronger overall staff.

CW Chart

User Profile



Telecom Vice-President Heidel

Marriott unites telecom, MIS

At the Marriott Corp. in Bethesda, Md., the information systems professionals bristle at being labeled as data specialists or voice specialists. According to Duane Heidel, vice-president of corporate telecommunications, the group likes to wear one hat.

"We are systems people. We are MIS," Heidel states. "Thinking like that avoids a lot of head butting that might go on."

Heidel joined Marriott nearly three years ago with the mandate to merge the corporate telecommunications function into Marriott's MIS group, known as the Information Systems Department.

Though he ran into the expected sensitivity and turf wars, Heidel is pleased with the overall smooth

> ***'We are systems people. We are MIS. Thinking like that avoids a lot of head butting.'***
>
> — Duane Heidel
> Marriott Corp.

transition at Marriott.

It took a while for the voice professionals to feel comfortable in an MIS environment, Heidel points out, more so than it took for the data professionals to adapt to voice systems.

"Somehow you have to cross-pollinate the two disciplines," Heidel says. "The toughest part is learning each other's jargon."

Despite those obstacles, he says he believes the Information Systems Department is "the glue that keeps the business together." Top management's acknowledgement of that fact, Heidel says, is what has made the merger a success.

In this merged setting, Heidel reports to the Information Systems Department vice-president, who reports directly to Richard Marriott, the company's executive vice-president. Bill Marriott, the president and

See MARRIOTT page 58

Meet our PC Modems

Choosing a modem for your personal computer just got easier.

Modems are remarkable little gadgets. They can connect you and your PC to mountains of data and oceans of information. But up until now, deciding which modem to buy hasn't been easy. So to solve that little problem, IBM is offering two 1,200 bps PC modems. Modems that not only give you the best features currently available on PC modems, but also offer features usually found only on higher priced, higher speed modems.

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Our other modem is the IBM Personal Computer Modem—an internal, half-card modem that operates at 0-300, 600 and 1,200 bps asynchronous.

The Non-Identical Twins

In some respects, these two modems are very similar. For example, they both have Automatic Adaptive Equalization—which means they will continuously fine-tune themselves to compensate for changes and noises on the telephone line. The result is, you can receive data over a wider range of phone line conditions. This is one of those features more often found on faster, more expensive modems.

In addition to automatic answering, both modems offer Adaptive Dialing—which means that if you don't specify either tone or pulse dialing, the modems try tone dialing for one digit, and if that doesn't work, they automatically switch to pulse dialing.

Both modems will automatically redial a number as many times as you tell them to. Or if you prefer, they can switch to an alternate number on a busy signal or a no answer. Once a connection is made, the modems automatically detect and adjust to the incoming transmission speed. They can also initiate an automatic log-on sequence including control characters, ID number and password.

And both modems have extensive "Help" menus, a complete complement of built-in diagnostics, a programmable speaker, and two phone jacks on the back so both your phone and the modem can be connected to the same line at the same time. You can even switch between voice and data without interrupting the phone call.

A Modem with a Memory of Its Own

The IBM 5841 stand-alone modem has some additional features you don't usually find on 1,200 bps modems. For example, the modem is switchable between asynchronous and synchronous modes and has a 20-entry Dialing Directory. Kept in non-volatile storage, the directory enables the modem to dial up and log on to systems automatically. This feature is most convenient when the 5841 is used with a fixed-function ASCII terminal such as the IBM 3161 or 3163.

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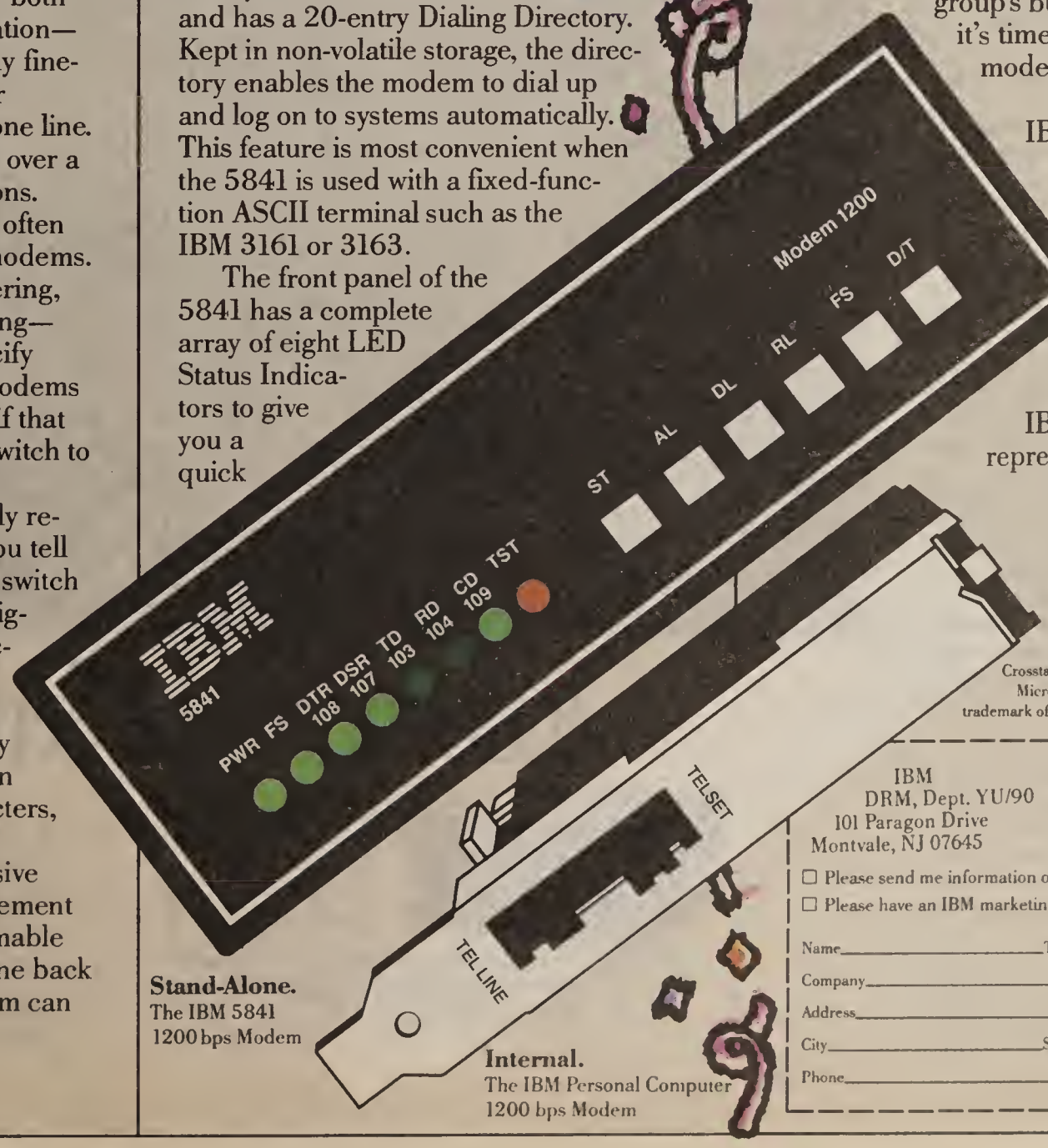

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MARRIOTT from page 56
chief executive officer, is also highly attuned to the technology-based functions of the company.

"We have very high visibility in our organization," Heidel points out. "The change has worked out very well for us as a group and for the corporation as a whole. The synergism between systems and telecommunications has come together. Now we are really able to support the business plan rather than simply being telephone movers."

With 150 hotels and a worldwide reservation network, Marriott recognizes the value of communications. Just as in the airlines business, Heidel says, his company needs a reliable, interactive data communications network to run the business.

"Even though they had a data network, top management sees that we've strengthened it and given it more reliability and visibility. They can see what information movement will let them do in broadening the whole base of business," Heidel explains.

Senior management shows its confidence and support for the systems department by constantly challenging the group to uncover new technologies and strategic plans to strengthen business.

"Top management in most Fortune 500 companies today understands technology and asks questions," Heidel says.

"But it's up to the people in MIS to hear them and respond. That's what's gotten us a lot of visibility. We have tried to be proactive and look at new alternatives.

"It's not just looking for cost reduction, either. We look at cost improvement that will improve our business position," he says.

Heidel has taken a step back from fighting the day-to-day fires, leaving that to his technical people, and has gone out looking for potential opportunities. Marketing to the corporation, the telecom vice-president says, is a critical function.

"You must go out in the field and explain concepts and benefits to the user; explain what new applications might do for them. Probably the most important part of my job is trying to foster that image of new technology. A lot of telecommunications people have not had to do that in the past," Heidel says.

Managing the telecommunications function within the MIS setting is ideal for Heidel who brought both DP and telecom experience to his position. But he realizes that the future holds plenty of challenges.

He is responsible for two other telecommunications groups within the corporation — one that provides new telephone systems to Marriott's hotels and another that does audits and maintenance to rooms operations.

> ***'The synergism between systems and telecommunications has come together. Now we are really able to support the business plan rather than simply being telephone movers.'***
>
> — Duane Heidel
> Marriott Corp.

"We are not as integrated with those groups as we'd like to be. It's a very sensitive issue," according to Heidel.

In addition, Heidel is constantly confronting a host of other challenges. Among the most critical he faces is the constant change in tariffs, which seem to spiral upward continuously. Many users trying to set up private in-house networks consider the tariffs punitive. "That directly impacts the bottom line," he says.

Also, the dynamic change in technology gives a voice and data manager nightmares.

"The technology is changing about every year. You really have to stay up to date with it," Heidel explains. "The big question is when do you plant a stake in the ground and say, 'That technology is for us.' At that point you are basically putting your job on the line and saying that is the right direction for the next three to five years."

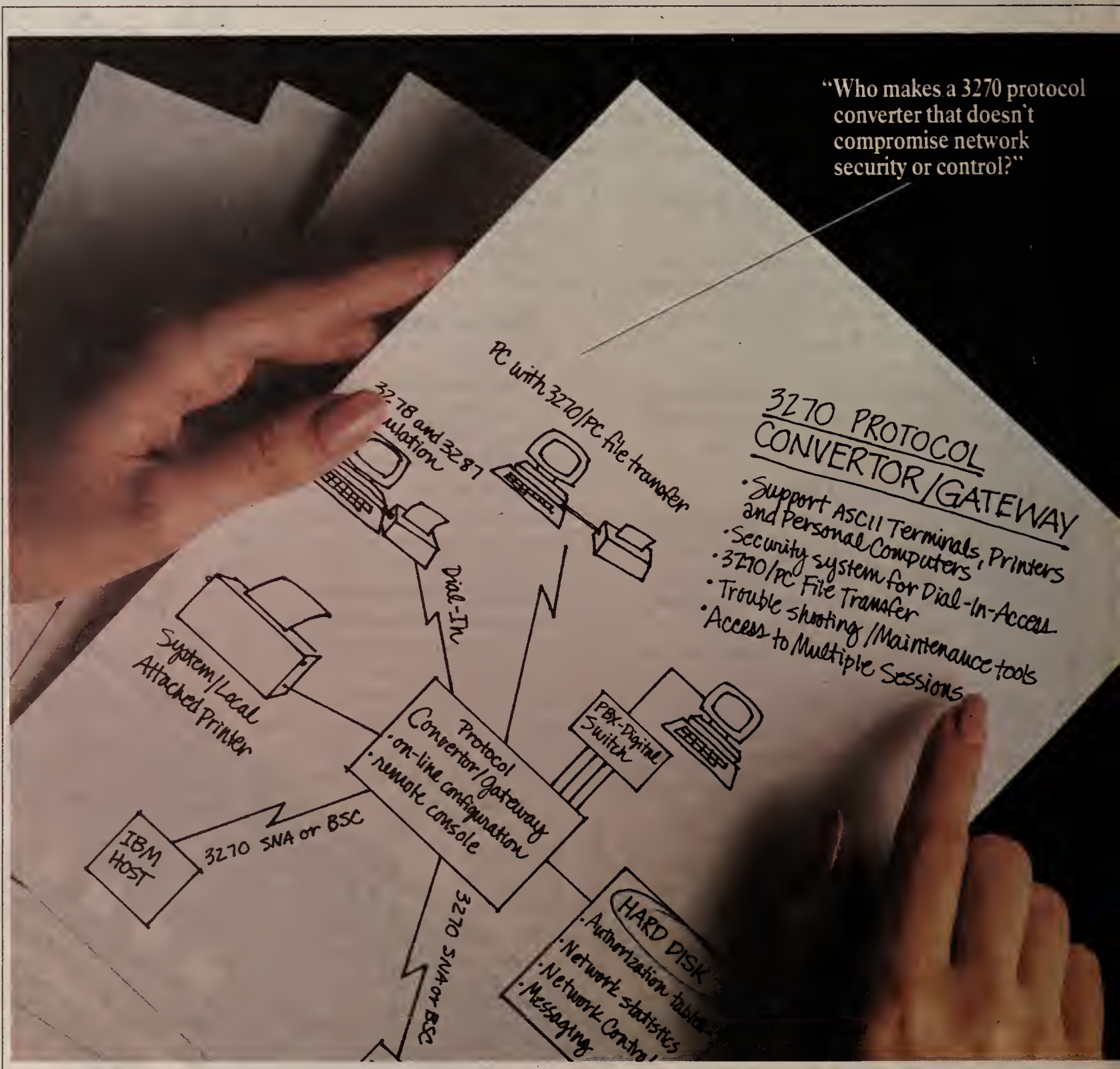
Heidel spends a great deal of time with vendors. The AT&T breakup forces telecommunications managers to forgo the one-stop shopping of years past.

"The breakup has really challenged telecom professionals. We are running a business now, buying and selling services," Heidel says.

From that point of view, Marriott expects a lot from its vendors. "We expect them to deliver," Heidel states. "If they don't, we go and look for somebody else."

— GLENN RIFKIN

Marriott corporation



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Continued from page 56

this and really don't trust the technical folks anyway. They aren't comfortable turning over the process to them and haven't done it," Frank says.

In environments in which senior management expresses interest in voice and data integration, the obstacles loom large. Strategic planning must result in a document to which the company and MIS adhere.

"Everybody does planning, but they don't initiate the plan," says Edward Horrell, president of Horrell & Mitchell, Inc. consulting in Memphis. "The plan has got to be a living document, a bible for the company's communications function."

Without that plan, Horrell says, the MIS and telecommunications manager is easy prey for the hordes of vendors seeking to capitalize on the confusion set off by divestiture.

> ***'The vendors are trained killers; they go for the jugular. They recognize when you don't know what you want and can overwhelm you with technology.'***
>
> — Edward Horrell
> Horrell & Mitchell, Inc.

"The vendors are trained killers; they go for the jugular," Horrell states. "They recognize when you don't know what you want and can overwhelm you with technology."

The multivendor environment created by divestiture has resulted in endless finger pointing. Many communications shops run six or seven different vendors' equipment. When something goes wrong, it may be difficult to get anyone to stand up and take responsibility.

Horrell advocates cultivating as much in-house technical expertise as possible but acknowledges that the lack of good people often makes that difficult. "It's a problem that is not going to get much better," he says.

Users agree that they must now know their systems as well as or better than the vendors. "I must stress the necessity of overseeing a multivendor network installation," GE's Shannon says. "To rely on one vendor totally is a lesson in the fine art of resume writing."

Beyond that, the MIS manager faces two distinct mind-sets in-house in the voice and data camps, differences that make it difficult to merge the two.

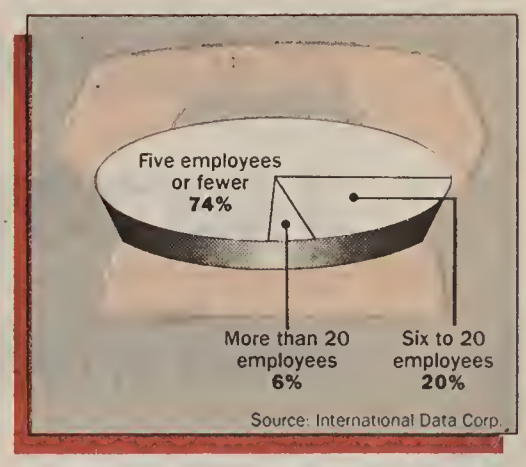
The voice manager is used to thinking in cost-per-call units and sees the world consisting of upgraded voice lines replacing lower quality lines when volume reaches a certain level, according to Joaquin Gonzalez, program director of strategies in telecommunications for the Gartner Group, Inc.

The end user can be talking over a voice-grade private line, a volume-discounted switch service like WATS or regular long-distance service and is indifferent as long as the connection is made and voices can be heard.

The DP manager, conversely, primarily provides the applications that end users demand. His No. 1 concern is finding the hardware to handle the application, and the No. 2 priority is software.

MITCHELL J. HAYES

TELECOMMUNICATIONS STAFF SIZE



"Somewhere around 10th on his list of priorities is how to economically connect the terminals to the host," Gonzalez says.

In addition, many software architectures being used in data processing do not even provide the option of going through a switched network. Gonzalez picks out IBM's Systems Network Architecture (SNA) as a primary example.

"Almost all of IBM's protocols dictate that you have to use a dedicated point-to-point or point-to-multipoint private line," he explains. "And the data manager has typically not looked at that as an area where he can either get functional improvement or economic improvement. They are used to deploying multidrop private line networks for individual applications.

"Data managers tend to have a project orientation which says, 'Now I've got my computer, my terminals, my application software, and all I have to do is connect the dots, and I'm off and running.' Never mind integrating voice and data; they typically don't even think about integrating *data* and data. So the first big problem you encounter is how do you change a company's operations to take into account that there is money to be saved by integrating voice and data?" Gonzalez asks.

At GE, Shannon points out that

Continued on next page

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Continued from previous page
there is a long-range plan to integrate voice and data but admits that going from the planning stage to implementation is difficult.

"There are a lot of forces pushing to get them together, but how do you manage two such totally different data streams?" Shannon asks.

"The key is to find a way to marry the two technologies, but that hasn't happened yet. People have tried to packet switch voice, but it is really too slow. They present distinct problems, particularly at the switch level. The parameters to switch them are entirely different," Shannon says.

Problems at the switching level are also highly political and territorial. According to John McQuillan, a Cambridge, Mass.-based communications consultant, integrating voice and data at the transmission level is an idea whose time has come and is proceeding in many large corporations.

"At the transport level, it's fine," McQuillan says. "DP managers are used to buying a circuit from AT&T, and if they can get one internally that is cheaper and faster, it's fine."

But the real problem comes at the switching level. "I haven't seen it done particularly well yet anywhere," the communications consultant says.

The scenario is simple. It requires that applications processors of, say, SNA and Digital Equipment Corp.'s Decnet, along with the voice applications processors, merge so that the switching of voice and data happens under one facility and one group's control.

An example would be SNA and X.25 packet switching. McQuillan says that it is now possible to run SNA over an X.25 network. "You can do that today, but no one does it because SNA management won't give up control of the network switching," he states.

The reason is obvious to McQuillan. "It can't be that they love spending hours rejetting the network or love having to worry about all the network addressing, flow control and switching. It's simply human nature. That's their job. Why do you want to take away their job?"

Control is crucial in the MIS environment. Gonzalez points out that the data communications staff is very reluctant to engage in a joint network design project with its voice counterpart because the staff members feel they are going to lose control over their own traffic and facilities used to fulfill applications.

This deep cultural problem can prove well worthwhile to solve in cost savings alone if voice and data networks could be merged. Consultants agree that a few organizations are at least taking the first steps in the right direction. Several companies have simply forced the two groups to work together.

Gagnon of Northrop explains that his company is undergoing a fairly significant cross-training program between voice and data personnel to help create a better understanding of each other's function.

The telecommunications people, with DP's help, are making extensive use of a personal computer network for doing order entry and inventory control. Conversely, the DP people are being guided in the use of long-haul transmission and understanding how that system works.

The DP and telecommunications groups at Northrop are jointly running after-hours classes in both disciplines. The courses are sponsored and taught by in-house personnel, and the curriculum covers a range of beginner to advanced topics.

For the telecommunications people, there are courses in Basic, Fortran, C, Martin Marietta Data Systems' Ramis II, IBM's DB2 and Lotus Development Corp. 1-2-3. On the DP side, topics ranging from basic telephony to the latest federal regulations and tariffs are covered.

According to Gagnon, the courses have been an absolute success. "They have helped increase interdepartmental understanding, and they've made the working relationship a heck of a lot

Continued on page 64

Attn: Mux Users

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Consultant Doll targets the bottom line in voice, data merger

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Dixon Doll is president of DMW Group, Inc., an Ann Arbor, Mich.-based communications consulting firm. A leading author and speaker on the telecommunications industry, Doll consults with leading Fortune 500 corporations on communications strategy and implementation. He was a featured speaker at the Communication Networks '86 show in Washington, D.C., in February, where he talked with Computerworld *Senior Editor Glenn Rifkin about managing voice and data communications.*

Dixon Doll

'One of the things that is happening now is . . . a trend toward the project-oriented, project team approach to managing complex networks.'

Is there a right place for voice and data communications to be managed? And is MIS the place or telecommunications?

As the technologies blur, it makes no sense at all to have technology-inspired boundaries in your organizational structure.

My strong belief — and I have seen this happening in a number of more innovative user organizations — is that they are beginning to adopt a more project-oriented approach to the management of information processing networks and telecommunications.

In other words, how do you stipulate differences between telecommunications and DP networks anymore?

Sure, you can get some technically inspired and maybe logically correct lines of distinction. But I think those really beg the fundamental question, which is, How do I get a group of technical resources — planning people, engineering people, operations people and installations people — configured inside an enterprise so that they can go out and have the maximum positive impact to benefit the organization?

One of the things that is happening now is that you are going to see more and more a trend toward this project-oriented, project team approach to managing complex networks of all types.

Who in the organization provides the impetus to create this architecture? Does that come from the voice side or the data side?

The impetus for the architecture has got to come from somebody who is strong in the organization and who is in touch with the senior users and senior management whose welfare the network is going to serve.

It is written frequently that that is increasingly becoming the MIS manager. I believe that the MIS manager is driving a lot of this trend. But I have certainly seen some institutions where the telecommunications executive is a strong person and where the responsibility for at least setting up the transport architecture was left in the hands of the telecommunications manager.

However, it is obvious that the two need to coordinate things very closely.

As the voice and data communications functions come together under MIS, what issues face the MIS and telecom managers?

One of the things that has got to happen early on for the marriage to be successful and for there to be a manageable environment is to address the organizational issues. If you don't do that correctly, you will never be able to realize the benefits of the possible technical solutions that are out there.

From an overall standpoint, the

Continued on next page

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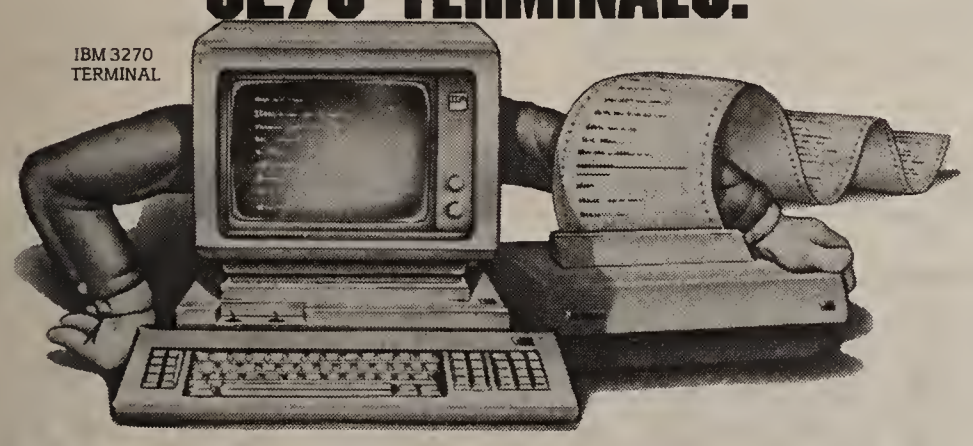

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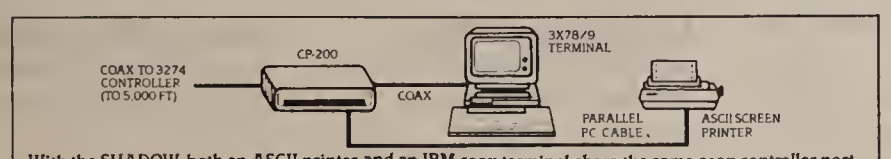

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Continued from previous page
key issues are the organization structure that fits in place, the preservation of clean interface boundaries, the itemization of the kinds of functions that you wish to have and the level of functionality in your delivery mechanism.

The last and most important issue is having a rationale or methodology for choosing which vendors are going to perform the specific functions you need in the system.

Choosing the right vendors is the most important issue?

You probably won't have a single vendor supplying all of your network management capability. You probably can't have an arbitrary number of vendors either. You have to pick some number, presumably in the range of three to six, and allocate to each of them a specific set of important functions that they respectively do well themselves.

> ***'You will find the number of Fortune 1,000 companies that operate without an information or a telecommunications plan today is very, very small.'***

Then you must make sure that you have, on top of that, a user architecture that allows those subsystems to be interfacing in a harmonious way in the complex network once it is being operated.

What does that ensure?

That addresses the reality of what happens when you have an end user at a terminal in a critical application and all of a sudden he or she can't get a response. They don't know whether it is the terminal, the modem, the link, the host, the application or maybe the T1 line that they happen to be sitting on top of. That end user doesn't care where that problem is. All he knows is that his application or his data base is unavailable. That is unacceptable.

The way you can assure the tightest degree of coordination is to segregate your people in your overall information systems and telecommunications organization by the basic categories of planning, engineering, installation and cutover and operations.

Are you seeing users doing this now?

My comments are the amalgamation of the best ideas that I have seen in the large corporations that we work for. It is clear to us that the successful client organization is one that understands planning and is willing to commit to putting an architecture in place for its own information processing and telecommunications network strategy.

Are people willing to commit?

They are all willing to commit. You will find the number of Fortune 1,000 companies that operate without an information or a telecommunications plan today is very, very small.

What is missing then?

The thing that is missing right now is working with the senior management to go in and effectively develop the methodology for looking at alternative ways that telecommunications can be used to create a strategic advantage for that business.

This means going in and effectively asking very hard questions: How can I use technology? How can I build a network? How can I put tools in the hands of key customers? Or how can I build a network that will interface the key suppliers, and what are the technical issues that have to be addressed?

More importantly, what are the opportunities for me to go out and take steps to introduce some new applications that will fundamentally change the balance of power between my company and my competitors?

Is the telecommunications manager today prepared to do this?

I don't know the answer to that. The jury isn't really even formed on that.

I am really talking about forming a joint venture

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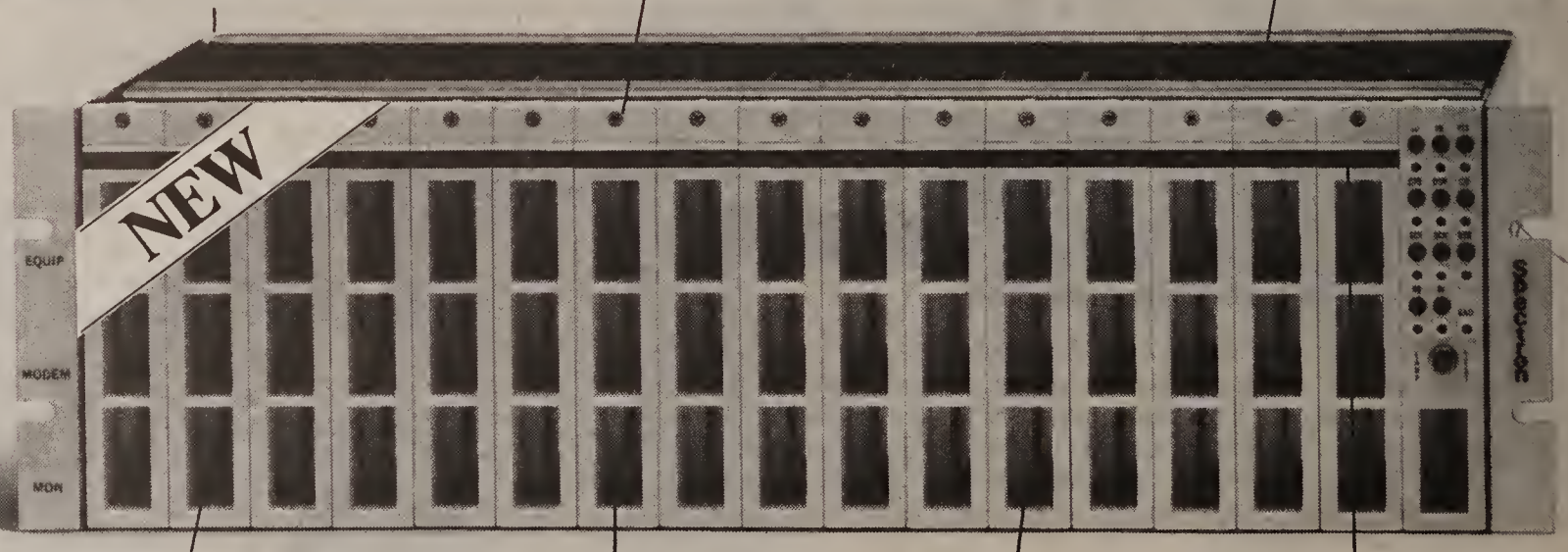

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between the telecommunications applications people and the MIS people, who have been around this track before, to go out and get right down into the issue of how can I use networking.

New applications that are going to increase volume, that will perhaps modify fundamental business processes.

What does that entail?

I have to have a way to go into this enterprise and take major systems and decompose them into particular types of tasks. Then I have to be able to find a way to judiciously introduce the usage of networks and standard interfaces and dependencies on data and access to information in such a way that, once I have got people signed up for that, they can't go away.

That is the whole key to me. I don't think that the telecommunications manager, in general, has a lot of experience in this. That doesn't mean that he can't respond to the challenge and become capable of doing this in some companies.

I would say that it is very dangerous to stereotype telecommunications managers. If I had to generalize them today, I would say that in a number of very large companies, you have some people managing telecommunications who came out of the MIS environment who have already been around this track and know how to do it. They would be very good candidates to do this kind of thing.

Does MIS need to take the lead?

They have to do it together because I think, in a lot of cases, MIS does not understand the specifics of the technology choices that are out there.

In those cases, it would make a lot of sense to go in as a partnership.

How much should MIS know about telecommunications? Should they just rely completely on the telecom manager?

No, it doesn't work that way any more. They [MIS] have got to know a lot about it now because in some of the technical issues of network management, the two are going to be inexorably intertwined. The term is probably becoming more accurately described as systems management.

> ***'They [MIS] have got to know a lot about [telecommunications] now because in some of the technical issues of network management, the two are going to be inexorably intertwined.'***

We are concerned about the availability of applications, the accessibility to data.

Is resistance to change a big problem?

In telecommunications organizations where they sat around and waited for change to happen, it almost inevitably came down on them from top management and was not as positive a step as if they had been proactive in initiating it.

It is very difficult in general, to ask organizations to modify themselves from a structural point of view and to assimilate change and to make things better.

That is one of the roles where an outside consultant very frequently is used because he is indeed in a position to know what the issues are that similar kinds of businesses are facing and understand how to integrate some of these issues in a way that is relatively nonpolitical.

Some of the other companies that I have worked with did recognize that the technology was changing. They recognized that as technology changes rapidly, technology-inspired boundaries in organization structures, by definition, become obsolete.

That is the point. If an organization is very lethargic and very slow and conservative, then that change is going to get imposed on them by the more aggressive people, typically those in the information systems area. ■

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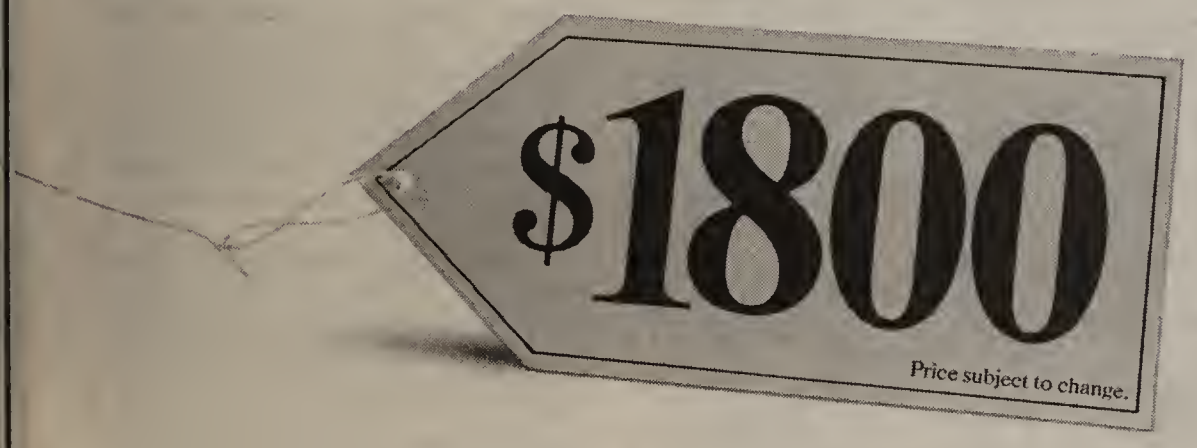

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Continued from page 60

better. Things go more smoothly, and there are less glitches in terms of getting things done," he explains.

Though the courses are voluntary, the incentives for attending are clear. The pace of change, both organizationally and technologically, has kicked up immensely, Gagnon says. "These new skills are immediately applicable to their jobs and the consequences of that, in terms of promotional opportunities, are obvious," he says.

McQuillan says he believes that another significant step forward would be reliable technology that provides benefits to both sides. The highly touted but still unrealized Integrated Services Digital Network (ISDN) concept would provide the solution, but one can only guess when that standard will emerge.

The Consultative Committee on International Telephony and Telegraphy-backed ISDN will eventually provide digital transmission of voice and data over a single ultrahigh bandwidth pipe. While the world awaits ISDN, other sophisticated switching devices are on the way. But technology alone won't be enough.

"Change is tough," McQuillan states. "People aren't going to surrender the control of their network switching and management to a new and unknown technique without a thorough convincing.

"So all in all, sharing transport or combining voice and data is arriving now. But sharing switching, or integrated voice and data, is going to be quite a ways into the future — probably the next decade, because the barriers are higher and the benefits are lower."

Other cultural differences between traditional communications and data processing professionals present more walls over which the MIS manager must climb. According to Horrell, the communications manager's job was traditionally justified by cost savings.

"They were hard-dollar specialists," Horrell says. "They were typically poor in finances, poor in interpersonal communications skills and had a poor image when compared with the more high-powered MIS or DP manager."

Today's telecommunications manager is facing what Horrell calls "option shock." There are simply too

Continued on page 68

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Integrated PBX remains a promise

By JEFFREY KAPLAN

Communications managers have been anxiously awaiting the arrival of the fourth-generation private branch exchange for almost five years. Though vendors claim their current systems offer many of the promised features of this innovative switch, none fulfills the promise of a truly integrated voice/data PBX.

International Data Corp. (IDC), a market research firm based in Framingham, Mass., says it believes the digital switching system, which vendors promised would integrate voice and data transmission over common twisted-pair wire, is still another year and a half from reality.

PBX vendors have finally unveiled systems capable of handling some data traffic. Yet, the systems that are available each have their limitations, and most require additional applications processors to transport data.

Northern Telecom, Inc.'s Meridian and DV-1 systems, Harris Corp.'s 20/20, Rolm Corp.'s Rolmbus 295 and AT&T's Systems 75 and 85 all require add-on processors and networking equipment to perform data communications functions. And those vendors like Ztel, Inc. that offer voice and data transmission capabilities in a single box charge a premium price for their systems.

The cost-effectiveness of using a voice-oriented PBX to transmit data is still considerably greater than using other data communications equipment. The per-line cost of an integrated voice/data PBX is between $1,000 and $2,000, while data PBXs can perform the same function for less than $500 a line.

PBX technology emerged in the 1960s with the introduction of an electromechanical switching system. This first-generation device was analog based and electronically hard wired.

A second-generation system was introduced in the early 1970s, boasting analog and digital capabilities. The system was microprocessor based, giving it stored-program control features. These included station features such as call forwarding, call holding, transfer and limited call accounting capabilities.

The range of features offered by PBX systems grew as the sophistication of the microprocessor technology advanced. Third-generation PBXs came onto the market in the late 1970s, featuring greater functionality as a result of the increased processing power of the newest semiconductors.

In addition, these systems could handle a limited number of data transmission tasks. However, the

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Kaplan is client service manager and senior market analyst for market research firm International Data Corp. in Framingham, Mass.

voice and data transmission enhancements required add-on applications processors or software packages. And none of the systems could handle the increased communications traffic in a nonblocking manner.

In the early 1980s, a new generation of PBX vendors emerged proclaiming that their fourth-generation technology could meet users' voice and data communications needs in a single switch.

The fourth-generation PBX promised a dual circuit and packet-switching capability, distributed architecture for local-area networking, nonblocked access and increased station and system control features.

The primary proponents of this new technology were CXC Corp. and Ztel.

Not to be outdone, the major PBX vendors adopted the marketing hyperbole of these upstart companies and applied it to their own product offerings. The result was added confusion among users concerning the available system options.

PBX vendors quickly found that it was easier to make bold promises than to keep them. Building a fourth-generation PBX proved to be much more difficult than they had expected.

The hardware elements were relatively simple to develop from third-generation technology. But the feature-rich systems required an overwhelming volume of software programming.

The time-consuming task of writing operating system code to handle the more sophisticated functions of the fourth-generation PBX extended the product development cycle to more than two years.

Compounding these product development problems were the inherent disparities between the voice messaging and data processing requirements of the new systems.

Telephony engineers approached the system development process differently from the data system designers.

This clash of cultures aggravated an already difficult product development process and made creating a truly integrated voice and data PBX nearly impossible.

One solution for PBX vendors is to establish strategic alliances with computer manufacturers. This setup gives the PBX vendor the data processing expertise that it does not have in-house. The IBM/Rolm merger, Wang Laboratories, Inc./Intecom, Inc./Telenova, Inc. joint venture and, more recently, the acquisition by Data General Corp. of United Technologies Corp.'s Communications Division PBX research laboratories are examples.

However, these relationships have been plagued by the same cultural conflicts that troubled the previous efforts to build a voice/data PBX. Corporate agreements to combine company resources have not overcome the philosophical differences between telephony and DP engineers.

As a result, these joint ventures have produced only limited tangible products, including integrated voice/data terminals, CPU-to-PBX interfaces and communications boards for PCs.

The IBM/Rolm experience epitomizes the problem. IBM is the data processing world, while Rolm helped to create the on-premise telephony market. Despite these firms' vast resources and considerable expertise, IDC does not expect the merged companies to unveil a new-generation PBX for another 18 months.

MIS managers have grown weary of the long wait for a fourth-generation PBX. Many have chosen to build parallel networks — one for data and one for voice — using a multitude of data communications devices on one side and the voice-oriented PBX on the other.

Users have invested a considerable amount of time and money to patch together modems, multiplexers, front-end processors, local-area networks, data PBXs and matrix switches to handle their data transmission requirements. This effort educates them about their system alternatives. It also creates a considerable investment in installed equipment, which users are hesitant to replace.

With increased experience and understanding of their organizational needs, fewer users are looking for the utopian all-in-one solution that the fourth-generation PBX promised.

In response, vendors have changed their marketing hype by moving away from categorizing their systems according to generational distinctions. Now, the emphasis is on system functionality and applications. ■

> ***MIS managers have grown weary of the long wait for a fourth-generation PBX. Many have chosen to build parallel networks — one for data and one for voice — using a multitude of data communications devices on one side and the voice-oriented PBX on the other.***

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Strong MIS demand lacking for voice, data integration

By DAVID DELL

Behind the hype of voice and data, there is a hedging of bets. Vendors and users clamor that they are in the game for keeps, but not many are betting their shirts. Right now, the voice and data integration marketplace is future-oriented. Vendors are selling and buyers are buying capability and migration paths and cushions against obsolescence. Real applications and immediate paybacks are scarce.

Ed Hooper, private branch exchange product manager at Lanier Business Products, Inc., says, "Our systems are 100% digital, and that is a key selling point — but our marketing information shows us that only 5% to 10% of our installations have any immediate application for the capability."

It is easy to fault the technology and say the standards are not in place, and voice people do not understand the realm of data — these observations are valid.

But there is much more that can be done with the technology available, and users are not forthcoming with demand. Even simple utilities like voice mail, integrated voice/data terminals or PBXs that can handle electronic mail offer benefits.

MIS departments must accept the fact that by and large, they have not taken advantage of what is available anymore than they did when Satellite Business Systems (SBS) came into the marketplace five years ago. IBM's connection to SBS was supposed to be the ultimate merger of voice and data, an idea that never panned out.

Even though voice and data technology can be improved greatly, it is already far ahead of what most people are trying to do with it. And the gap is widening.

Part of the trouble is that it is not easy or natural to think of voice as an application. We all talk and use that skill for countless applications. We tend to think of oral communication as informal and undisciplined and associate those qualities with the technologies and the people who manage them.

Fortunately, there is a major opportunity now to earn while you learn. Two things need to be learned: how to integrate and how to apply integration.

In terms of integration, data communications people largely do not trust voice media or voice switches — although, for the most part, they rely on them in the public networks.

Now that major vendors are acknowledging networks using twisted pair, some of that distrust may go away, but there is a lot of money to be saved in terms of avoiding wiring and rewiring internally and using switches for voice and data.

As Bill Darden, head of telecommunications at Northrop Corp. points out, "Data people have a lot to learn about voice, and one thing they have to learn is that they are paying a lot for what they do not know. About 20% of the cost of communications goes for data, but only 5% of the circuits and one half a percent of the traffic is data.

"It doesn't take a genius to figure out how to save money by sharing ports, hosts and wiring. Voice communications managers know more about how to switch and share than data people. That knowledge can be shared with a little cross-training and cross-doing," he says.

That kind of effort more

Dell is president of THD Associates, a New Jersey-based consulting firm focusing on the opportunities and risks associated with the convergence of voice, data, text and image products, networks and services.

than pays for itself in the short term, and it does not have to entail getting new people or new technology in order to upgrade capability.

The learning of applications, however, is not as easy. Whose job is it — MIS, office automation, telecom, administration, the information center? Any or all of these departments might get in the act for voice mail or selection of a PBX or putting in voice data workstations.

Frequently, they all have something at stake, but no one really feels they own the application, in the sense that it is more than "nice-to-have" and can pay for itself. Only in the past two years have some applications grown up into the "must have" category.

Where are these applications? Here are some early models beginning to get attention:

Telemarketing. Probably the fastest growing and most easily understandable area is supporting the work of those who sell over the phone.

Whether selling magazines or megadollar money funds, these people make money for their companies by knowing the right thing to say, knowing everything about the product they are attempting to sell and knowing who they are talking to. It helps to have the terminal spell out a script in these areas.

Customer service. This area is now recognized as key to successful competition. Computers can give the illusion that knowledgeable people are available at each phone.

MIS departments may have been exposed to some of this field service through problem resolution at their network control centers. Giving the same type of support to corporate clients is now seen as a high pay-off arena.

Field support. No one needs more voice and data integration than the company representative who has no office. Whether it is a salesman calling in an order and looking for his messages or a route driver who wants to know where to go next, there is a need for both formal data as well as for a quick, sure response from a pay phone. The technologies do not have to be mixed at all — but there needs to be integrated support.

Transaction processing. Voice recognition may not be up to speed yet for taking orders, but voice synthesis is turning the telephone into an order-taking machine.

People Express Airlines and American Airlines use experimental systems and voice menus to walk users through to their choice of flight and price. These systems may be too complicated to succeed, but talking automated tellers and gasoline pumps are not far behind talking cash registers. They will be essential to companies wanting to survive the drying up of the entry-level labor market.

In each of these areas, there are potential profits that can keep a company ahead. The applications will be less costly and easier to support with tomorrow's technology.

But in the meantime, there are many things MIS can do. It is never quite clear whether technology drives the application or the application drives technology. When it comes to voice/data integration, there is room to apply the technology in more specific ways than we have so far envisioned.

At Wendy's International, Inc., for example, they are currently exploring how voice/data integration might be applied in the fast-food environment. Some of the ideas were generated by key executives and the head of MIS brainstorming about how technology might transform the fast-food business.

They recognized that they were in a very competitive environment and that they had to be constantly aware of the options such technology opened. Integrating voice into the environment was one of the computer applications suggested.

The approach may well suggest the path many companies will be taking — for them integration will mean having voice integrated into the applications portfolio, as a user interface here and an order taker there. The real integration issue we face is not of integration of voice and data technology, but rather, their intermingling in the way we get work done. ■

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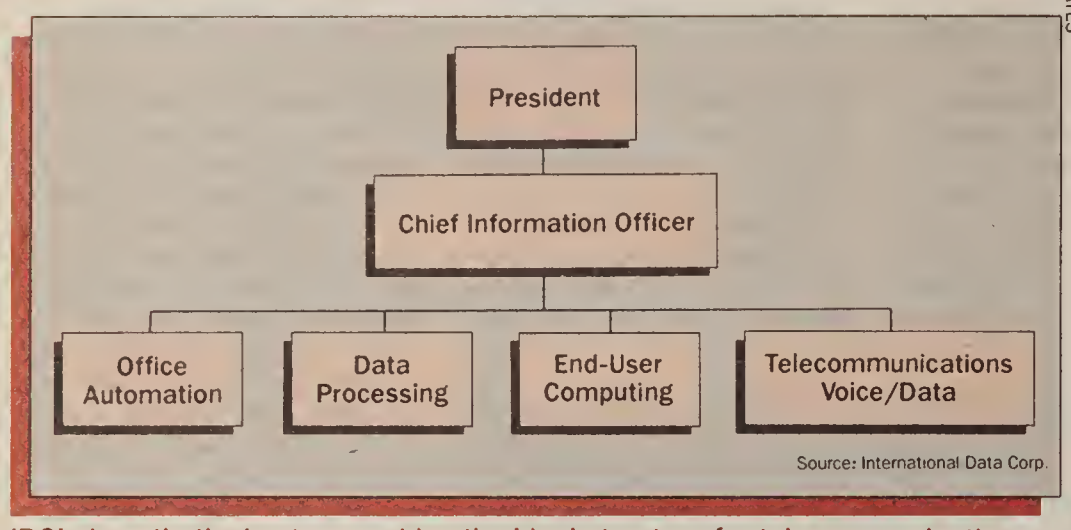


MITCHELL J. HAYES

IDC's hypothetical setup provides the ideal structure for telecommunications.

Continued from page 64

many choices and decisions to be made since divestiture, and Horrell says it has all happened too fast. He isn't convinced "the old dog can be turned into a sleek new greyhound."

There are exceptions, but he is seeing more young movers and shakers, particularly from vendors, pouring into the key communications spots in major corporations.

"It's real hard for the 30-year Bell man who has been made communications manager of a company to look at things with the same attitude as an account executive with six years experience with Northern Telecom or IBM," Horrell declares.

For the MIS manager charged with overseeing the merging of the two disciplines, personnel and administrative problems may outweigh the most serious technical roadblocks.

Telecommunications professionals tend to feel intimidated when thrust into the MIS environment.

"They don't talk the same language," Horrell says. They feel they will be embarrassed in an MIS setting.

Companies that have successfully joined the two disciplines cite the need to smooth over the cultural barriers as being among the top priorities. There seems to be no management formula for success in this area.

At Northrop, "We are trying to regrind the conceptual lens through which everybody approaches the problem," Gagnon explains. "It is a task and a half. You need to get through the syndrome of 'We've always done it this way.' It will happen, slowly but surely, simply because the executives here have been pushing this so vociferously."

Gagnon says he believes his telecommunications people are up to the transition because the company was extremely careful in the hiring and training processes. A significant in-house training program has been established to help employees make the transition, and the atmosphere is one of great excitement about the group's potential.

> ***Telecommunications professionals tend to feel intimidated when thrust into the MIS environment. They feel they will be embarrassed in an MIS setting.***

"We make it clear that there is bottom-line impact on what they do; here's how it fits into the total operation," Gagnon says. "It's pretty darned exciting as you get people talking about how to get the company more competitive in a competitive environment."

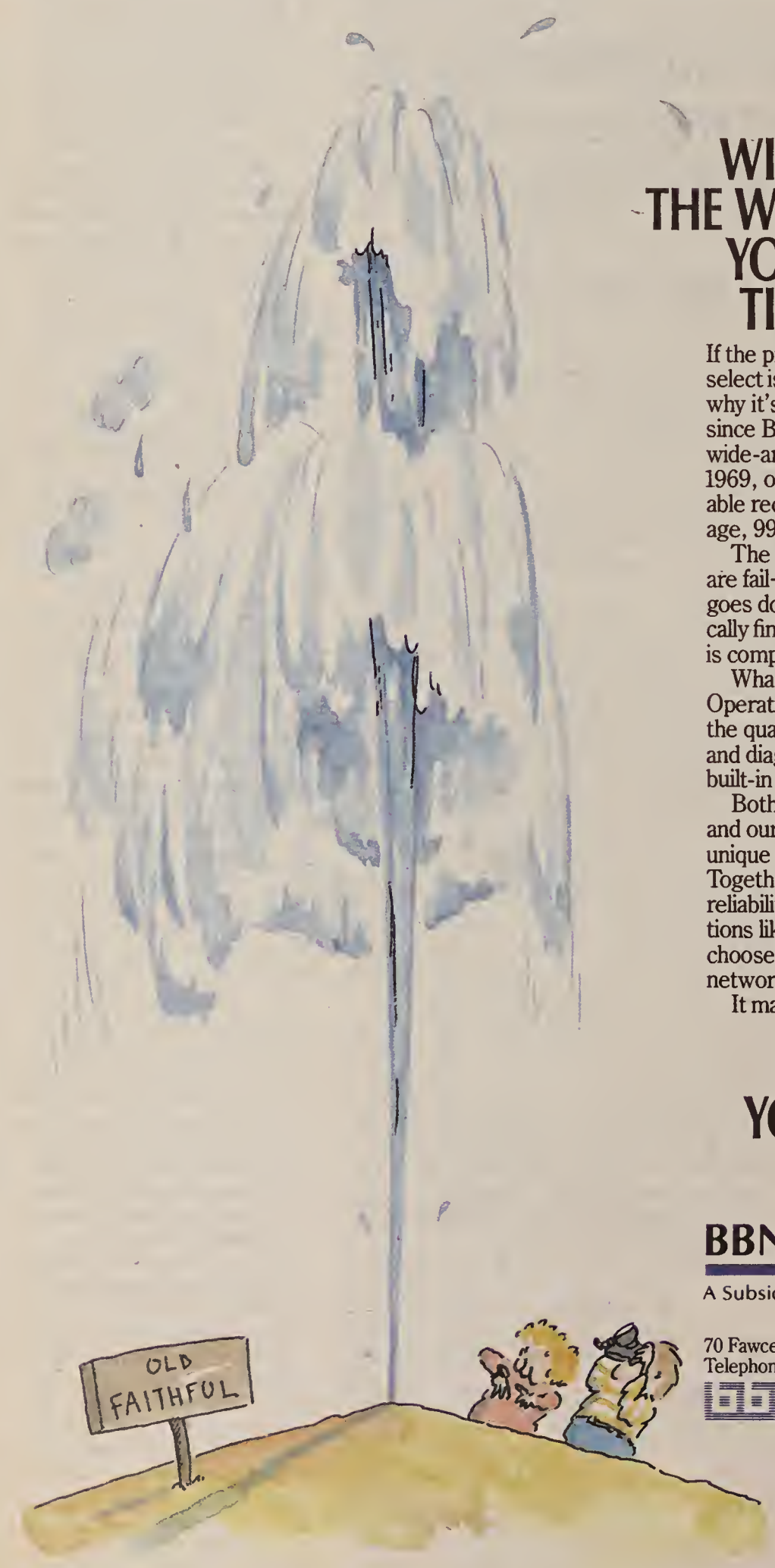
As the profile of today's communications professional shifts, it becomes more difficult to find quality people to fit into this new MIS environment. "That's the question of the day," Horrell states.

Beyond looking to vendors for skilled people, corporations are seeking college graduates with training in telecommunications and MIS. Many universities now offer courses and even advanced degrees in both areas. Companies are bringing in these graduates and doing extensive in-house training.

USA Today in Rosslyn, Va., decided not to merge telecommunications with MIS, but the two groups rely heavily on each other. Bill Hider, vice-president of telecommunications, believes his toughest problem is finding qualified people.

"There's more pressure to become businessmen, to apply our skills to the business situation," Hider says. "But it's not as simple as that. You can't throw an MBA into the battle without any technical background. It won't work."

Hider says that there is simply no



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substitute for experience, and the price for people with that experience is going up dramatically.

Hider spent a year and a half searching for a director of telecommunications who could oversee voice and data communications "at a price we could afford."

"It's a problem, and it's going to get worse," Hider says.

According to Horrell, many companies have simply begun to raid other companies in a bidding war.

"There's such a small amount of real talented people that combine those skills, and they are demanding good-size salaries," Horrell says.

"There are a lot of communications managers making six-figure salaries, and that is indicative that they are doing a lot more than just saving their companies a few dollars. They are positioning their companies for the competitive edge," he says.

While seeking good staff members, MIS must also stay current on the rapidly changing technologies and handle the nightmare of regulatory uncertainty with ever-changing tariffs.

"A lot of telecom managers are getting to be part-time legislators and politicians," McQuillan says.

But perhaps the most crucial test facing those in this mixed environment is to get out in the field and discover what the end users will want and what they will need even before they know it themselves.

"If you can do that," McQuillan insists, "then you can put things in place, and there won't be any organizational infighting over it. People will be quite happy to sign up for it.

"The trouble is that hardly anybody can anticipate and express their requirements for telecommunications. In the old days, it was very simple. Either you needed a telephone, or you didn't. But these days, communications substitutes for goods, inventory, people's time and all sorts of other things. To really seek out and identify those opportunities requires quite a lot of insight," McQuillan says.

Frank agrees. The building and managing of these integrated systems promises to be much more complicated than anyone currently perceives.

"We are clearly in the developmental stage now. I would hope that in the next five years, people start thinking more about how this relates to the business and their environment rather than blindly building systems. That is where the real payoff is," Frank says. ■

> ***'In the old days, it was very simple. Either you needed a telephone, or you didn't.'***
>
> — John McQuillan
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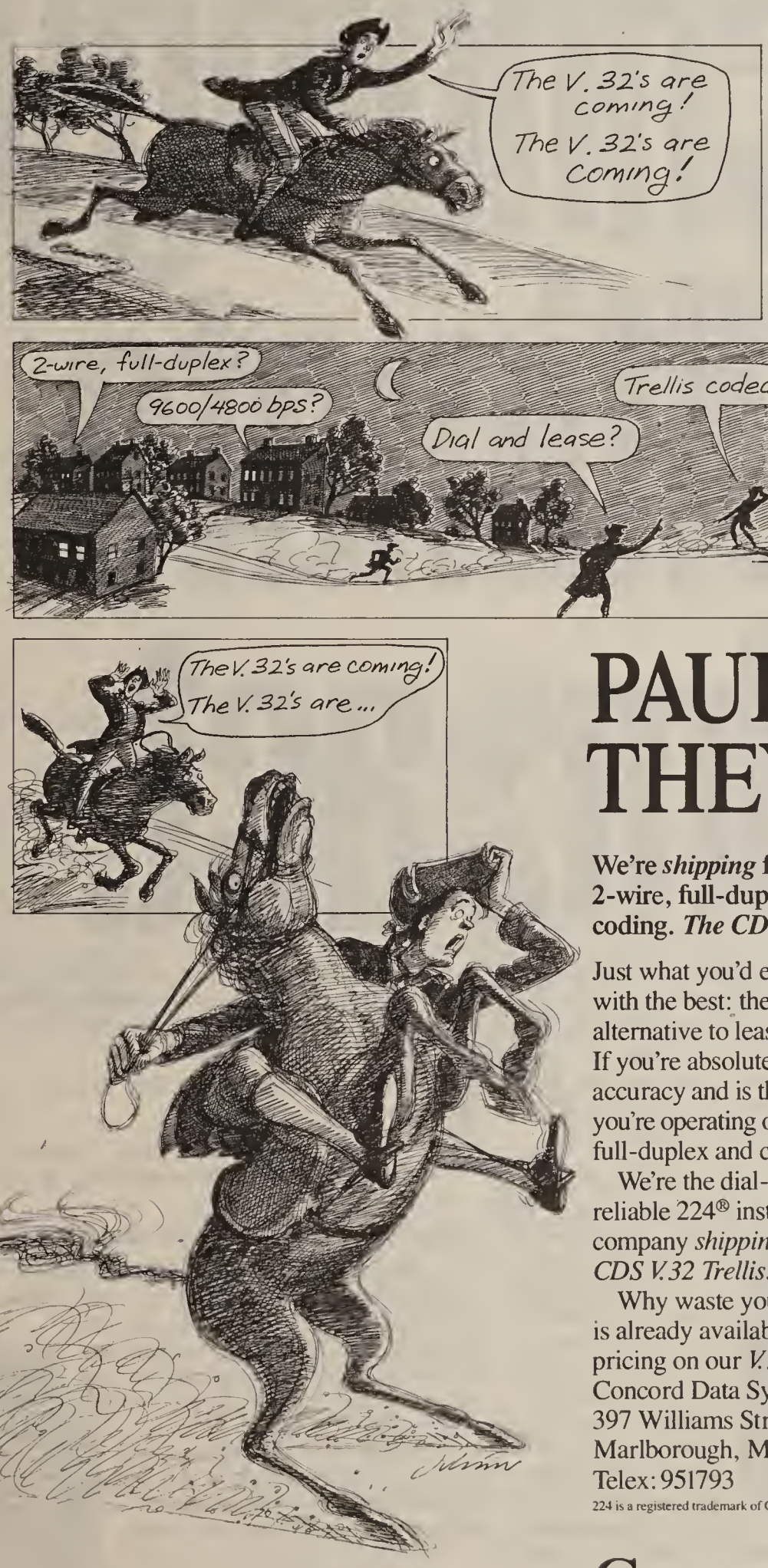

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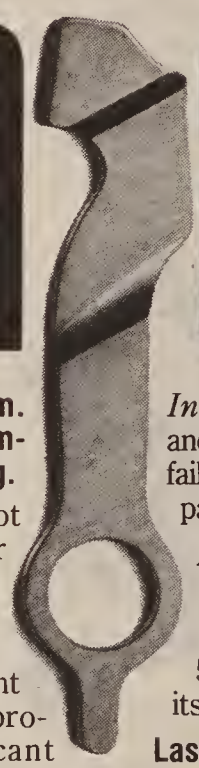

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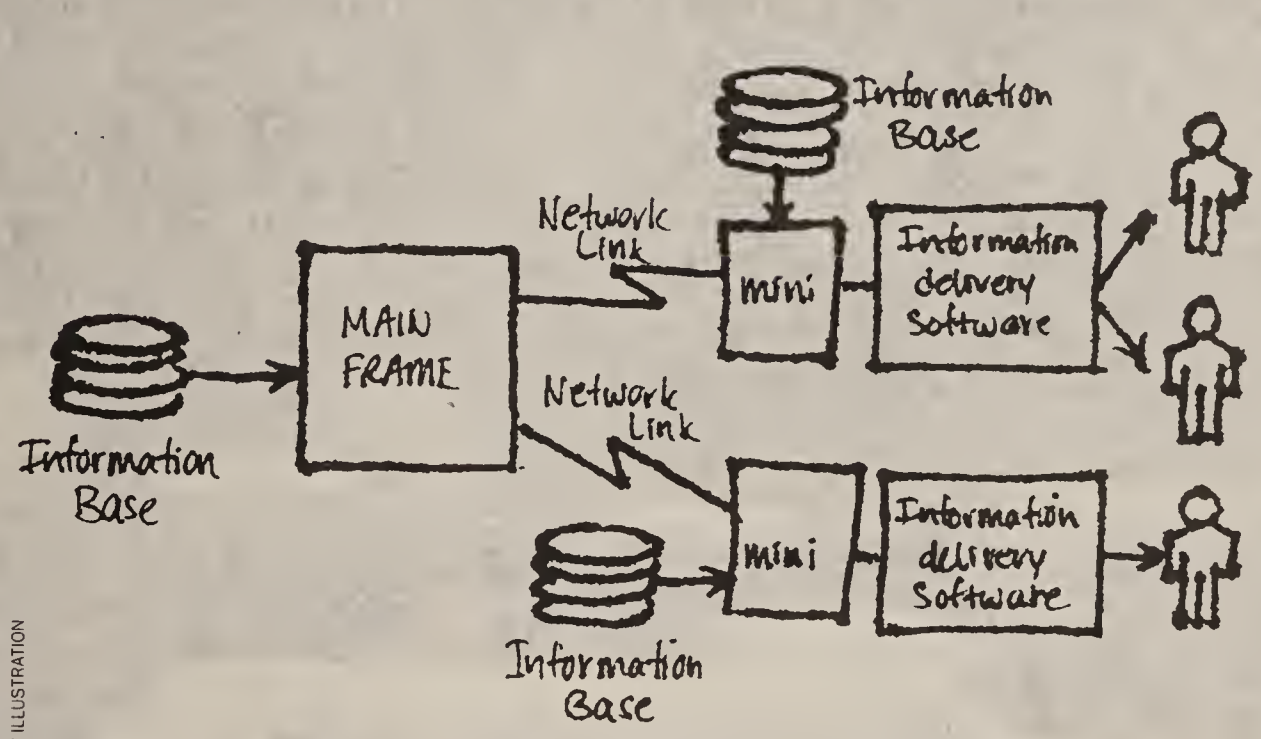

CW ILLUSTRATION

The problems of paper publishing make videotex a viable alternative to mainframe report generation, with DP as the transaction engine and as a major source of information to the system.

By ROBERT MEAGHER

Videotex and data processing are rarely mentioned in the same context. The divergent technological growth of minicomputer-based videotex and mainframe-based DP has encouraged cultural differences between users and variances in application development approaches. However, videotex and batch-oriented DP share the same goal: to process and provide information.

Can they be brought together? Videotex and DP can establish a connection, and DP personnel should be actively involved in developing videotex services.

Videotex is an interactive vehicle for organizing and distributing information electronically. Typical corporate videotex applications share general characteristics:

- Access to information is casual or random.
- Information frequently is preprocessed from external sources.
- Information is textual, perhaps including some simple business graphics.
- Information may be updated and distributed almost instantly.
- For potential access outside of the host system, gateways to other information and DP services are desirable or required.

DP generally deals with a recurring, well-established set of corporate information processing needs. If DP technology were tied to videotex technology, imagine how much faster, more efficiently and more "on-demand" managers and their employees could obtain mainframe-based information.

A form of electronic broadcasting

Videotex differs from electronic mail, which is the directed transmission of messages from an originating party to a known destination party or parties.

In videotex and other forms of electronic broadcasting, the identity of the destination party generally is not known and is not important. All the sender, or information provider, in the broadcast medium must know is the demographics of the target audience. This knowledge permits the sender to adjust or enhance the relevance of the broadcast information for the audience's benefit.

Who should function as the information provider in the corporation? Right now, there is no single answer. The MIS/DP, publications, engineering and telecommunications departments, to name a few, all suggest and install systems. No rule states who must provide information to the corporation,

---

Meagher is a senior software engineer at Computer Methods Corp., a software engineering services firm in Marlton, N.J.

> ***Some people think that anything called videotex possesses rigid characteristics that make it impractical or impossible to implement more than a few applications, too simplistic for the implementation of any serious information delivery applications or of no relevance to DP.***

department or office.

Electronic broadcasting services target three distinct audiences:

Business to business. This market involves resellers of value-added information services geared to corporate entities, for example, telemarketing, product catalog services for industrial components or financial information retrieval services for investors.

In the future, Wall Street will make its various newsletters and advisories to individual and institutional investors available electronically.

The public market. Computer-based technology is spawning a growing number of public information kiosks displaying consumer-based information services. Public information delivery is also characterized by data bases, home banking and other financial services, retail services and electronic bulletin boards.

In-house. Paper applications, such as employee newsletters, product information and information on competition, MIS reports and literature catalogs and ordering systems, could become computer-based in a videotex system.

The attractiveness of videotex is as an add-on service in large corporations that have already installed computer networks.

Videotex significantly reduces the costs of gathering, formatting, distributing and disposing of paper documents.

It also reduces paper publishing's hidden costs: the deteriorating value of information over time, the obsolescence and disposal of printed materials and the information maintenance costs in recurring publications such as catalogs and reports.

Screen-oriented service

Since British Telecom introduced it in the early 1970s as Viewdata, videotex has appeared as a color-graphics-based, screen-oriented service requiring decoders or dedicated terminals.

The user interacts with a videotex service through menu screens, navigating through a hierarchically organized information base, according to the menu selections made. Because the pages in an information base generally are numbered, direct access by page mnemonic has also been a standard capability.

From past encounters with what has been billed as videotex, some people think that anything called videotex possesses rigid characteristics that make it impractical or impossible to implement more than a few applications, too simplistic for the implementation of any serious information delivery applications or of no relevance to DP.

DP's role

When would DP play a role in choosing and configuring a videotex service? Home banking is one example.

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dial-up bank-at-home services that include the standard features expected from an automated teller machine. Some also provide more sophisticated functions, such as portfolio management services and gateways into news services.

'Distributed' application

Naturally, banks are concerned primarily with the task of maintaining large amounts of information through a considerable investment in DP facilities and technology.

In at least two cases, the home banking services are based upon interconnections between minicomputer-based videotex information delivery systems and IBM mainframes, which handle the transaction and data base portions of the system using existing applications. This application can be considered "distributed" because information and functions reside on different computer systems.

Also, there is an electronic link — whether it is IBM's 3270 protocol or Systems Network Architecture, Digital Equipment Corp.'s Decnet or some other means — for tying the systems together compatibly.

Therefore, assume a front-end electronic broadcasting system that includes a gateway to one or more mainframe applications in the corporate DP environment.

In the heterogeneous environment of the home banking example, with differing system types and communications protocols, the hardware and software need to link the systems in order to transfer and inquire against data bases and application processes.

Naturally, DP personnel must be involved in the process of choosing hardware and communications protocols, and they should understand the interactions between the information delivery and transaction-processing software.

Some mechanisms have been at least partially implemented to bridge the gap between videotex services available on minicomputers and the large applications and data bases on mainframe systems.

Purveyors of information to the corporate masses find themselves bombarded by products and services promising delivery of information to end users. Some of this technology is based in the low-end world of minicomputers and personal computers.

Form and vehicle

Arguments rage over whether a videotex information delivery service is best implemented monolithically on a mainframe computer or in a networked fashion on minicomputers. In short, what the world has been arguing about are the form and the vehicle for videotex — the hardware-software configuration.

Though the first videotex systems, such as those designed by Aregon Ltd., were minicomputer based, companies such as IBM, Videodial, Inc. and Langdon countered with products that implement "mainframe videotex." These vendors claim mainframe videotex eliminates the need for the minicomputer as the middleman in getting mainframe-based information into the hands of information consumers electronically.

Minicomputer-based videotex vendors contend that their systems off-load the delivery function from the mainframe and can be just as, if not more, efficient for distributed information delivery.

In any case, DP personnel involved in videotex implementations must be able to determine why and how the connections to their applications will be made.

Additionally, they must understand an implementation's impact on their own systems and should definitely be involved in deciding how best to achieve the desired results.

Jumping-off point

Whichever route the DP/MIS manager chooses for implementation, videotex software can be used as the jumping-off point for a large class of information delivery applications.

It does not matter whether one chooses to call the implementation videotex. What matters is whether the economics of the situation are right to use existing equipment or to invest in whatever it takes to establish the service and the necessary linkages to DP data base and transaction-based applications.

Mike Hays, former

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manager of the Videotex Engineering Program at DEC, frequently emphasizes minicomputer-based applications as the way to sell videotex.

However, he maintains that "with strides being made in telecommunications and with the acquisition of more personal computers and networks by corporations, the economic feasibility of more distributed services in the corporation is improving rapidly."

Hays notes that, by connecting videotex to its mainframe, one regional telephone holding company is replacing all of its in-house paper-based report distribution.

He also says he believes that "the problems of paper publishing make videotex a very viable alternative or supplement to mainframe report generation, while keeping DP definitely in the picture as the transaction engine and as a major source of information to feed the system."

Implementations

Although joint ventures among computer manufacturers, telecommunications services providers and banks or retailers have been announced, participants are saying little about implementation.

The following are examples of current videotex applications.

Manufacturing. A large East Coast manufacturing materials producer selected videotex to tie together several of its dispersed, minicomputer-equipped plant sites with centralized information.

Although currently only a pilot program, the company is actively determining how it can devise gateways to its mainframe systems, which are the backbone of corporate MIS.

Insurance. An insurance company in New Zealand has plans to implement videotex as a means of providing an interface between adjusters and policy information maintained in mainframe data bases.

The company's choice of the videotex system was based partially on the favorable impression made by a particular minicomputer-based videotex product and partially on the fact that the product had the capability to communicate with the company's mainframe system.

Pharmaceuticals. A major mid-Atlantic drug manufacturer is establishing a videotex system to make personnel policy information available to employees and formulations and product information available to researchers.

The formulations are kept on one of the company's mainframe systems. The firm chose videotex as a fast front end to its existing DP

> ***"It does not matter whether one chooses to call the implementation videotex. What matters is whether the economics of the situation are right to use existing equipment or to invest in whatever it takes to establish the service and necessary linkages to DP data base and transaction-based applications."***

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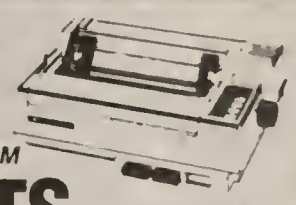

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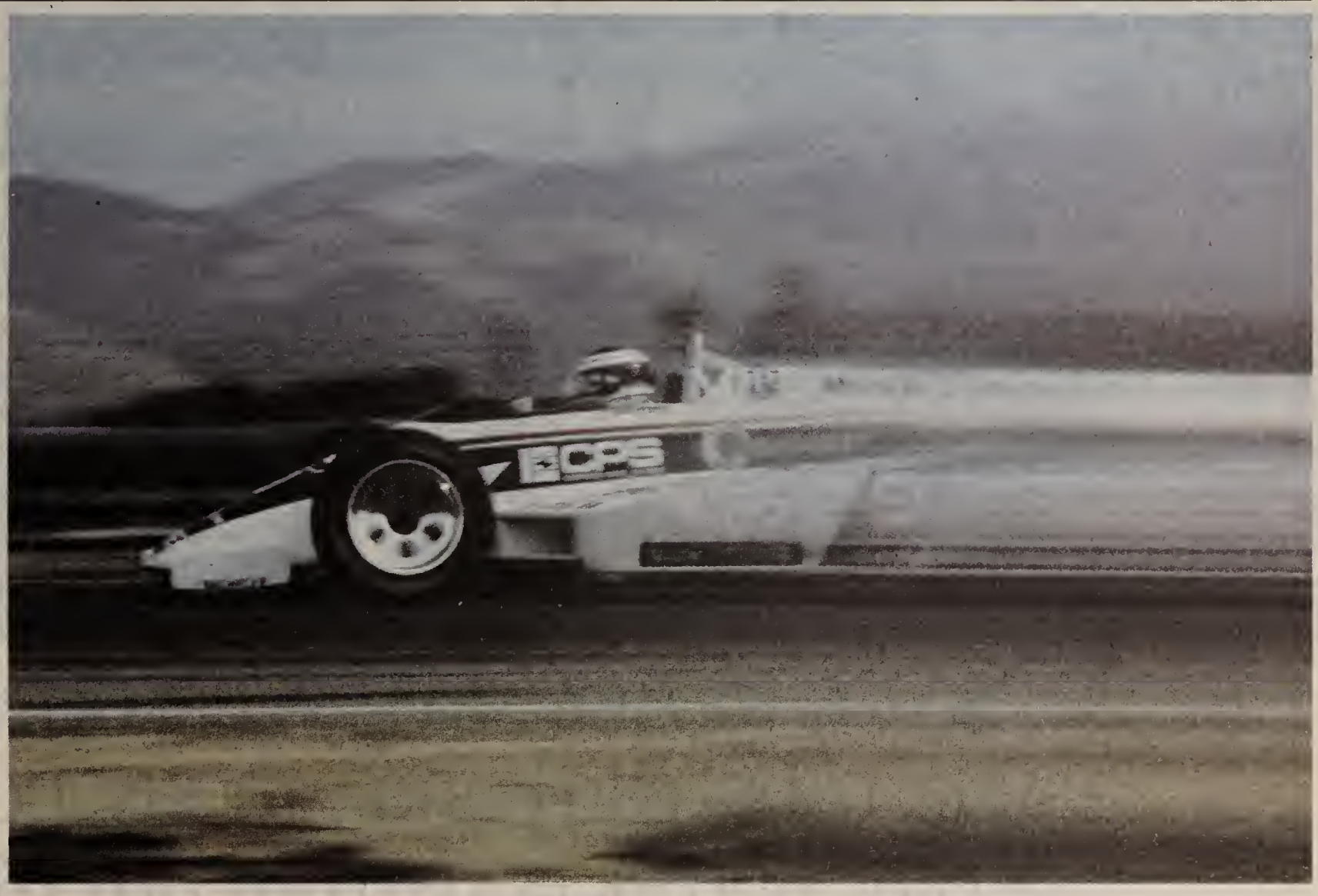

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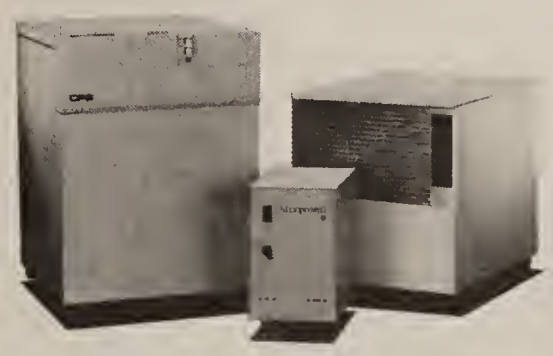

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> ***'Videotex isn't a toy anymore. People are taking it seriously because of the capabilities of connecting it to real, dynamic sources of information.'***
>
> — Mike Hays
> Digital Equipment Corp.

facilities, not as a replacement for DP.

Retail management information. In Australia, a major retailer plans to use videotex to provide top management with DP-derived reports on-line.

Although paper reports currently circulate to management, the DP department determined that the cycle of providing information to managers needed to be shortened and opted for videotex as the bridge between DP and management information delivery.

Literature order processing. In addition to maintaining dozens of information bases scattered around its network of more than 3,000 CPUs, the publishing and circulation services group of a major computer manufacturer implemented an in-house literature catalog browsing and ordering system that serves as a front end to an application that was designed to record and produce order reports.

The group chose to implement videotex because of the technology's efficiency and its ability to work in a distributed fashion, providing access to virtually the entire corporate population.

Financial information services. A major U.S. investment adviser is exploring the feasibility of offering information services on-line through videotex.

If the offering appears to possess retail potential, the company expects to offer much of its current mainframe-based information research and inquiry facilities through the same vehicle.

Many companies that were formerly solid mainframe shops are investing in minicomputer-based videotex after seeing the value of a tie-in to their mainframe data bases and the chance for peaceful coexistence of the two computer philosophies.

Information at fingertips

If we classify videotex as a legitimate subset of electronic broadcasting, then we should expect that the optimum implementation of a videotex system will be built upon software — whether minicomputer- or mainframe-based — that provides for links between the broadcast service itself and the various applications that reside on the host computer (if a minicomputer) and the mainframe (if different from the videotex host).

Some products can extract information from mainframes and even participate in traditional transaction processing.

As DEC's Hays says, "Videotex isn't a toy anymore. People are taking it seriously because of the capabilities of connecting it to real, dynamic sources of information."

The bottom line is this: With an appropriate information delivery package to start and some additional amount of time and effort invested, a corporation can put a powerful network of information at the fingertips of its employees. Mainframe-based information can be broadcast to its "readership" in a fraction of the time required with paper-based technology.

Electronic broadcasting, videotex — whatever its name — is a sleeping giant that soon will prove to be a profitable, cost-saving information dissemination vehicle in synergy with the DP world. ■

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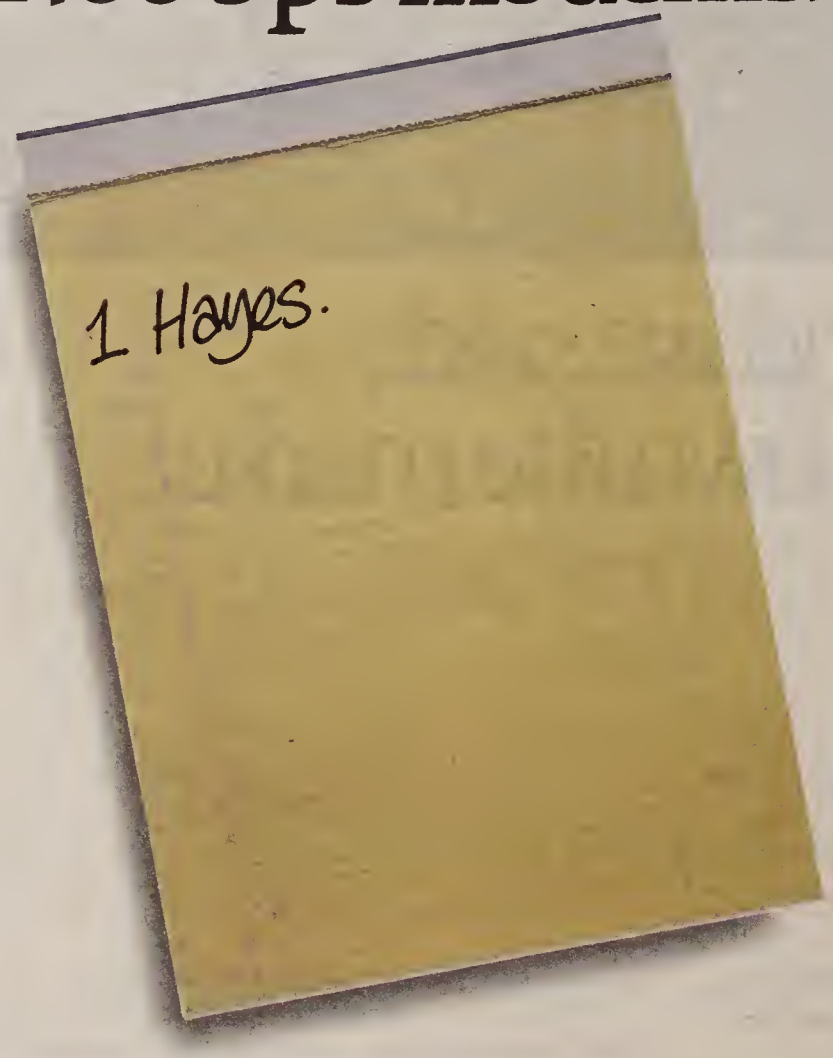

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AT&T progeny offer customers a single place to buy

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In a classic case of sibling rivalry, the seven regional holding companies cultivate distinct personalities to compete for business sales via retail stores, third-party maintenance contracts and IBM applications expertise. For all seven, providing customers with a dial tone remains top priority.

By BRYAN WILKINS

Straining under the judicial restrictions that were established during their birth as independent corporate entities two years ago, the seven regional telephone holding companies are nevertheless rapidly making it known to corporate America that they are a natural source of computer and communications expertise and service.

Two years ago, the courts forced AT&T to abandon its seven offspring to the real world of business competition. Since then, the shock of separation has worn off. The seven companies assumed their own distinct personalities and adopted very different approaches to serving their largest sources of revenue: small, medium- and large-size businesses.

Providing customers with a dial tone remains top priority. AT&T's divestiture terms legally require the holding companies to devote substantial attention and capital to keeping their local exchange network operational. The holding companies — Nynex Corp., Bell Atlantic Corp., Bell South Corp., Ameritech, Southwestern Bell Corp., U.S. West and Pacific Telesis Group — are parents to the 22 divested Bell operating companies that provide regulated local telephone service.

But the seven are champing at the bit to deliver new integrated computer communications services to businesses. One example is selling equipment in conjunction with the flagship business product for voice-grade communications — Centrex. AT&T can now sell corporate customers the multiplexers to upgrade their installed copper wire for data communications.

Each regional holding company has set up subsidiaries to sell and service computer and communications products that target corporate users. Under the terms of divestiture, these communications products are unregulated commodities, and the incorporated subsidiaries that sell them are business equals to the former Bell operating companies.

Early this year, for instance, Nynex added six Datago Business Centers to its chain of 14 stores across New England that sell computers and telephone systems to businesses. Importantly, all six stores are former Computerland franchises that switched affiliation to Nynex's Business Information Systems Co. (BISC), an equipment sales subsidiary established by Nynex after divestiture.

Nynex, serving New York, Rhode Island, Massachusetts and Connecticut, decided that one way into the highly competitive market for business installations was to combine computers and communications sales through the retail store.

"We are committed to retailing. It's an important way we meet the communications and information needs of our business customers," said Douglas J. Mello, president of BISC, at one store's reopening in Boston last month.

One-stop shopping

Like Nynex, the other six regional holding companies have embarked on different strategies to reach businesses whose managers are interested in merging their computer needs with communications. The corporate customer looking for the single place to buy is an interesting and potentially important retail market for the telephone companies, says Amy Francis, telecommunications analyst with the Yankee Group of Cambridge, Mass.

She envisions a retail environment in which a variety of products can be looked at by customers with the knowledge that the retailer is not the manufacturer with a seller's bias.

Retail is not the only area that illustrates the holding companies' strong potential presence in the computer and communications integration business. Nynex BISC recently won a contract from the United Nations in New York, beating out other vendors to win a $7.8 million job to coordinate the revamping of the organization's telecommunications system.

The contract calls for Nynex to link nine buildings with fiber-optic cable and base the system around an Intecom, Inc. Integrated Business Exchange S/80 digital private branch exchange (PBX). The network will be used primarily for voice communications right away and data communications at a later stage. Nynex's contract specifies that products such as software will be supplied by third parties.

In a similar vein, Bell Atlantic, serving the mid-Atlantic states, made a

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Wilkins is a Washington, D.C.-based writer specializing in communications.

major investment in the computer business shortly after divestiture two years ago, buying the computer maintenance and computer sales firm Sorbus, Inc., the largest such computer servicing firm in the country.

In January, Ameritech, serving the Midwestern states, announced a major acquisition. The company purchased Applied Data Research, Inc., a New Jersey software applications firm with IBM systems expertise.

Bell South, serving the Southeastern states, now owns an equipment subsidiary that sells customer premises equipment and office automation products. The company established other subsidiaries in the areas of fiber-optic local-area networks and shared tenant services, also called "smart buildings."

In addition, Bell South has established marketing contracts to sell and install IBM System/36 computers and the entire equipment line of Digital Equipment Corp. plus NEC Corp. facsimile units and Paradyne Corp. modems. In all, Bell South set up 11 subsidiaries (in each of which it holds up to 100% interest) with products aimed at the business market.

Strict terms

"The seven Bells would obviously like to be all things to all people if they could. Unfortunately [U.S. District] Judge [Harold] Greene won't let them, so they are going to have to be patient," comments Francis of the Yankee Group.

The divestiture terms, which Greene enforces, and the current regulatory policy of the Federal Communications Commission require that companies keep sales of computers and telephone equipment — such items as PBXs and multiplexers — financially separate from the regulated transmission services the telephone companies provide through the local exchange.

These terms — which call for separate corporations with separate accounting — resulted in split marketing and sales forces that have caused confusion and anger among businesses that are forced to deal with multiple contacts and maintenance schedules.

Efforts to remove this split marketing and service delivery are under way, and the FCC aims to relax portions of the separation rules, setting a target deadline as early as June.

"They [the seven holding companies] are in the best position to be the single point of contact for the business customer. Nynex is very smart to target the small and medium-size customer with the Datago chain, because none of the other companies are spending any time on this market," Francis says.

However, she says the regional holding companies must emphasize telecommunications expertise primarily in order to sell themselves as integrated computer-communications providers to corporations. While slowly trying to position themselves as integrators of customer premises PBXs, local-area networks, micros, fiber-optic cable and multiplexers in customized configurations, the telephone companies are at the same time concentrating on capital investments in their local telephone exchanges to keep businesses using local exchange services.

For now, the seven companies are hitting hard at the theme of reliability as they spend millions of capital expense dollars to upgrade the switching offices that are the key to becoming full-range information servers to corporate America. According to Nynex BISC President Mello, "We bring a sense of stability to the market. Businesses know that we'll be here tomorrow."

Francis of the Yankee Group says that bypass of the local exchange by the largest and most important customers remains the biggest concern of the seven regional holding companies' telephone subsidiaries at the moment, forcing them quickly to upgrade the technical capabilities of their central office switches in order to offer the services businesses want most.

Bypass popularity grows

Some companies with large volumes of voice and data traffic opt for private suppliers of transmission capacity at the local distribution end — bypassing the local exchange, AT&T or otherwise. The seven regional holding companies and their local telephone subsidiaries face this threat increasingly as corporate incentive to go with a bypasser grows, according to Jerry Lucas, president of Telestrategies, Inc., a Washington, D.C.-based consulting firm. Hence, many of the local telephone companies have decided to bypass their own public switched exchange, if necessary, to provide direct links.

To do this, the seven holding companies are feverishly converting the existing analog central offices, which predominated at the time of divestiture, to digital central offices. This digital capability provides the telephone companies' core appeal to the corporate customer, who increasingly needs to transmit large volumes of computer data as well as voice.

A widely heralded push to capture both voice and data traffic from its customers has been undertaken by Bell Atlantic, which has energetically tried to dispel the notion that existing telephone company central office technology cannot meet sophisticated needs of users.

Bell Atlantic's existing Centrex service contracts to provide the federal government's local voice telephone service are up for renewal this year. Many federal agencies and departments are wrestling with a major decision: whether to stick with the local switched service or to opt for the in-house PBX switch, which offers newer features such as station message detail recording, call

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Bell Atlantic, aware that it faces a loss of millions of dollars in revenue if existing Centrex customers switch services, added new features such as station message detail recording, call waiting and voice mail. The FCC also granted regulatory relief, which permits Bell Atlantic to sell Centrex, a tariffed service, in conjunction with telephone equipment sales.

"Uncle Sam said he wanted to be able to deal with one vendor, not two," notes A. C. Tedesco, Bell Atlantic's vice-president for marketing.

Bell Atlantic saw an opportunity in this successful repositioning of Centrex to hawk the ability of the central office as the hub for complete service. The company now positions Centrex as a forerunner of the highly touted Integrated Services Digital Network (ISDN), for corporations that require a wide variety of networked services including videoteleconferencing, facsimile transmission, high-speed customized data circuits on a user-demand basis and integrated voice/data service.

Keeping price increases down

While the costs of upgrading the analog central offices to digital capacity require enormous capital expenses, the holding companies are not passing these costs on to their customers immediately. For example, Bell Atlantic's marketing pitch for the new Centrex enhancements describes a Centrex Central Office Local-Area Network based on existing copper wiring, which cuts down the need for expensive, new investments by users.

Greg Lakin, division staff manager for Centrex and Central Office services at Bell Atlantic, says the company is "overwhelmed" by positive customer response to the Centrex Central Office Local-Area Network product.

"We feel there is a real pent-up demand for a service that will manage and network micros in the office, and this [local-area network product] does it without the expense of rewiring. It's a low-cost, low-risk approach and a free way to get into a network solution," Lakin says.

According to Lakin, Bell Atlantic is preparing additional interfaces to the Centrex Central Office switch including an IBM 3270 synchronous link to be announced later this year.

Additionally, Bell Atlantic's Lakin predicts "the next big wave" of new features will permit the connection of end users' broadband (Ethernet) local-area networks and baseband (token-ring) networks to the telephone company's central office switch. Another possible product in the pipeline would establish multiplexed gateways that link mainframes to the phone company's central switch.

But Lakin declined to discuss whether Bell Atlantic is preparing such a product. "I think users have found out that running data through the PBX is fine, but that they choke up when you reach 4% to 6% of traffic. The multiplexer link to the central office can be an attractive solution," Lakin adds.

Regional expansion

Pacific Telesis, based in San Francisco, embarked on its own particular strategy toward marketing to corporate users by emphasizing network services such as Centrex enhancements. Pactel's approach resembles steps taken by Bell Atlantic and has not moved into the retailing of computers and office automation systems.

> ***'We want to get away from the mentality of being order takers and concentrate on becoming a service-oriented, customer-driven enterprise.'***
>
> — Bill Hensley
> Illinois Bell

In February, the company received a significant boost when Judge Greene granted it permission to buy Communications Industries, Inc. of Dallas, a cellular phone systems company with franchises scattered across the country.

The significance of the judge's ruling lies in its allowing Pactel to enter into competition outside its geographic boundaries, where it vies against the other six regional holding companies in the provision of cellular services.

Centrex by another name

Southwestern Bell, based in St. Louis, Mo., dropped the Centrex name in favor of a new one, ESSX. The company offers configurations for voice and data stations ranging from 30 lines to a customized configuration with unlimited station connections, ESSX Custom. At the same time, Southwestern Bell, like many of the other holding companies, is preparing its own ISDN experiments.

These experiments depend on digital switches and central office services like Centrex. The holding companies initially seek customers with specific needs that can be configured into custom integrated voice and data services quickly, with enhancements to be added later.

One example is Illinois Bell, a subsidiary of Ameritech, which recently announced an integrated voice/data service called Integrated Information Network (IIN). The service allows end users — in this case, the University of Illinois at Urbana — to switch between voice and data circuits from

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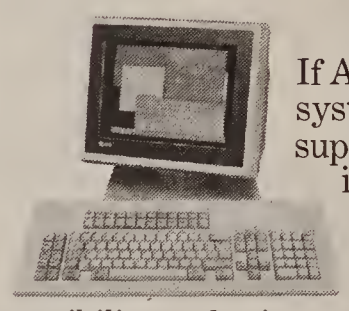

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the campus according to their needs. The switching, however, is performed at the Illinois Bell Central Office switch.

Illinois Bell says the contract for IIN is worth $30 million and that the company intends to market the service commercially to businesses with similar needs. An important aspect of IIN is that the customer can negotiate with Illinois Bell the rates for using the service on a contract basis, because the Illinois Commerce Commission declared IIN a competitive service.

While Illinois Bell can negotiate rates for IIN on a customer-by-customer basis, it still offers its tariffed Centrex service — with enhanced features — the way Bell Atlantic has done, says Bill Hensley, a public affairs spokesman with Illinois Bell.

Restaurant experiment

Illinois Bell is also currently in the middle of a widely publicized ISDN trial implementation with McDonalds Corp., the restaurant chain. The experiment is based on upgrades to existing digital central office switches and will serve the company's headquarters.

"We want to get away as far as possible from the mentality of being order takers and concentrate on becoming a service-oriented, customer-driven enterprise," comments Hensley of Illinois Bell.

Southwestern Bell displays a more cautious approach tinged with expectation that the telephone company's role as a utility provider will inevitably change. Steve Dibner, staff manager for sales operations, says the company has not rushed into new fields such as computer retailing but instead strives to meet the immediate communications needs of users in its principal metropolitan areas. These users increasingly need large transmission media and turn to Southwestern Bell for help.

The company is currently in the process of signing agreements with independent third parties that will sell computers and office automation solutions in conjunction with a service such as ESSX, the central office switched service. "This is how we have chosen to respond to the customer who desires a single point of contact," Dibner says.

Vertical approach

At U.S. West, a different marketing approach is currently being developed, according to Lois Leach, manager of public relations. U.S. West, serving the West and Northwest except the states of California and Nevada, is preparing a vertical marketing strategy that targets specific niches and delivers a custom solution. U.S. West identified five vertical markets, each of which it will target with integrated marketing plans.

The vertical markets, Leach says, were identified as hospitality and lodging; professional services, such as accounting, law, public relations and architecture; manufacturing; finance and banking; and state and local governments. U.S. West says it expects to begin announcing products aimed at these vertical markets by this June.

"We're not going to be in the computer retailing market, not going to be selling stand-alone computers," Leach says. "It's a difficult market. What we want is to become systems integrators, to tie together incompatible equipment.

"We realize we can't do this for everybody, so we have to focus on industries and niche markets that are looking for that kind of solution," Leach says. As an example, Leach cites the health care industry and the need for sanitary telephones in hospital rooms. She said U.S. West is preparing a marketing plan to supply disposable telephones to hospitals.

Spotty customer support

The regional holding companies' efforts to diversify into new markets beyond the regulated, safe world of local exchange services may seem like one positive outcome of divestiture. But the move has some analysts worried.

"They don't know what they're doing," comments Fritz Ringling, telecommunications analyst with the Gartner Group, Inc. of Stamford, Conn. "They're jumping all over the block into new areas they know nothing about. It may appeal to Wall Street, but they don't know anything about systems integration and computer hardware from the user's perspective. They should go more slowly and move in a more systematic fashion."

Ringling and others say that the equipment subsidiaries are loosing money for their parent companies by competing in a cutthroat market. "They should stick to what they know best — develop packet-switching services and PBX-based services first, before they go to office automation," Ringling adds. He predicts that one or two of the seven regionals is heading for a major stumble as their business enterprises collapse.

"The state public utility commission will then have to handle the mess. The ratepayers will not be willing to pick up the tab, and that leaves the shareholders holding the bag," Ringling says. He cites the statistic that AT&T in 1985 lost $700 million in its equipment subsidiary, AT&T Information Systems, and mentions the recent charge by the North American Telecommunications Association that the seven regional holding companies in the first nine months of 1985 lost $471 million, attributed to their equipment subsidiaries.

Ringling says Gartner Group research has not uncovered much in the way of customer support from businesses and corporations for the holding companies' attempts to be systems integrators. "I take a very dim view of their efforts," he says. ■

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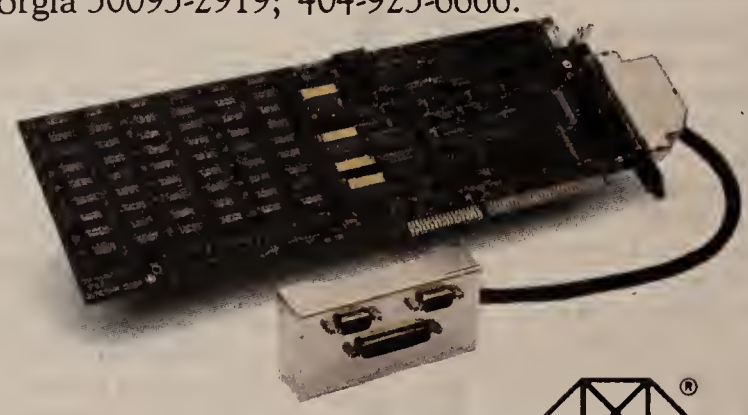

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NEW PRODUCTS

DEC unveils latest tools for Dectalk

Voice synthesizer gets module, eight-line unit

Digital Equipment Corp. of Maynard, Mass., has introduced two new versions of the company's Dectalk voice synthesis product.

Added to the original Single-Line Dectalk are the Multi-Line Dectalk, a rack-mounted, eight-line unit; and the Dectalk Board, a single voice channel module designed for system integration.

According to a spokesman for the company, Dectalk is a voice synthesis product that converts computerized text into a natural, high-quality human-sounding voice with a flexible, unlimited vocabulary. It is able to speak in nine different voices and in speeds ranging from 120 to 350 words per minute.

The Multi-Line Dectalk connects to a host computer with a standard RS-232C connection for each channel. It is upwardly compatible with Single-Line Dectalk but is said to be optimized for larger, high-volume applications.

Multi-Line Dectalk is priced at $24,000.

The Dectalk Board is an 8- by 10¼-in., single-channel module designed for system integrators who want to supply mechanical mounting, power and telephone connections.

The Dectalk Board is priced at $3,000, DEC said.

From Touch-Tone phone to terminal

Single-Line Dectalk reportedly allows any Touch-Tone phone to become a computer terminal.

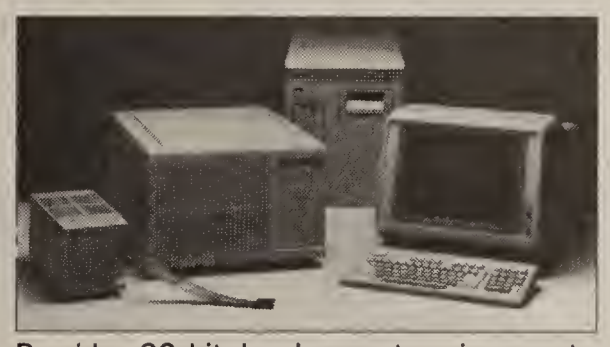
The product is said to be able to receive or originate telephone calls and to send speech through a telephone line, a built-in speaker or an external speaker or headset. It is intended for applications requiring no more than four telephone connections.

Single-Line Dectalk costs $4,000 per unit.

Development system bows

Tektronix, Inc. of Beaverton, Ore., has introduced the Multi-V Systems, which are said to provide a complete 32-bit development environment.

According to a spokesman, the Multi-V Systems offer a software development environment as well as a software/hardware integration environment for Motorola, Inc. 68020 and Intel Corp. 80286 microprocessors.



Provides 32-bit development environment

The Multi-V Systems are hosted on Digital Equipment Corp. VAX family computers running either DEC VMS, DEC Ultrix or Unix. They offer 1M to 9M bytes of memory. RS-232 support at 19.2K bit/sec. is standard, and the systems can be connected onto the VAX's local-area network, the vendor stated.

Language support

Language support for the 68020 and the 80286 includes the C Language Development System (Clands II) and Software Executers.

Clands II support includes a C compiler, C language directed editor, 32-bit macro assembler, relocating linker, an integrating control system and a C language debug system.

Output from the compiler or assembler is downloaded from the host computer into the Multi-V Systems to be run on the Software Executer. Software/hardware integration support includes a 68020 emulator and an 80286 emulator. Two emulators or Software Executers can reside in the same mainframe, according to the vendor.

Prices for complete entry-level systems for software development start at about $20,000.

Costs vary according to configuration needs and options.

Tallgrass Technologies offers line of internal hard-disk and tape subsystems

Tallgrass Technologies Corp. of Overland Park, Kan., has announced a line of three internal tape and disk/tape subsystems.

The TG-1020I is an internally mounted, half-height, 5¼-in. tape drive said to back up 20M bytes of data on a DC-2000 tape cartridge. It is compatible with IBM Personal Computer XTs and ATs. It is priced at $995.

The TG-2025I is an internally mounted, full-height, 5¼-in., 25M-byte hard disk with a 20M-byte tape drive. It also backs up data on a DC-2000 tape cartridge. It is compatible with IBM Personal Computer XTs and is priced at $1,995.

The TG-1425I is an internal, 3½-in., 25M-byte hard disk that mounts inside a personal computer with a half-height, 5¼-in. tape drive storing 20M bytes of data on a DC-2000 tape cartridge. It was designed for use in AT&T and Olivetti & Co. microcomputers. It is priced at $2,095, the vendor said.

According to a spokesman, the internal disk and tape subsystems all come with two software programs. The first is Xtree, manufactured by Executive Systems, Inc. of Sherman Oaks, Calif. It is a menu-driven file and directory management program designed to simplify the use of IBM PC-DOS and Microsoft Corp. MS-DOS commands. The other is Backtrack, a software-based, automated hard-disk backup system.

The drives also are said to come with documentation, controller, cables and mounting hardware.

INSIDE

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SOFTWARE & SERVICES

Systems software

Honeywell, Inc. has introduced **Integrated Query System** (IQS), a fourth-generation information retrieval and development system for its DPS 7 mainframe systems.

IQS is said to allow access to DPS 7 data bases and files with menu and screen-oriented software that combines procedural query capabilities with nonprocedural commands.

Users can reportedly create their own files without building intermediate files.

In addition, users can have multiple views of the same information in a variety of formats, Honeywell reported.

The basic IQS for systems operating under Honeywell's GCOS 7 is available for $145 per month.

Optional components range from $40 to $98 per month.

The total package with four optional modules costs $310 per month.

Honeywell, P.O. Box 8000/A-79, Phoenix, Ariz. 85066.

H&W Computer Systems International has released an enhanced version of its **Sysd** software.

Sysd is a CICS-based system containing an ISPF-like editor, spool display/print capabilities, DASD/dataset utilities and CICS tuning and debugging aids.

Enhancements were made in performance, security and function. Panvalet library data will be available to the full-function editor facilities and the multiple-session management that are provided.

Sysd operates in VS1, MVS and MVS/XA. Licenses start at $17,900.

H&W Computer Systems, P.O. Box 4785, Boise, Idaho 83711.

■

Sterling Software Marketing Co.'s Dylakor Division announced **Release 2** of its software for information retrieval, development and testing of DYL-280 and DYL-280 II programs — **Dyl-Online under TSO/ISPF/MVS** — and released **Dyl-Online under CICS/MVS.**

Release 2 allows users to generate an unlimited number of program and file definitions and have as many libraries as required.

Dyl-Online under CICS/MVS reportedly allows users to define report requests on-line with syntax checking before submitting them for execution under DYL-280 or DYL-280 II.

Dyl-Online under CICS/MVS and Release 2 of Dyl-Online under TSO/ISPF/MVS cost $6,000 each, the vendor said.

Dylakor Division, P.O. Box 3010, 17418 Chatsworth St., Grenada Hills, Calif. 91344.

Applications packages

Computerized Forms Management, Inc. has added the Unix-based **Inventory Control System** to its Formanager product line.

The system was designed to maintain forms and supply inventory, to set economic form reorder points and to manage warehouse floor space.

According to the vendor, it tracks back orders automatically and generates reports documenting current form quantities, unit cost by form, forms on order and forms due for reorder.

The system handles multilocation inventory sites. It costs $6,800 for a two-user license and $1,000 for each additional license.

Computerized Forms Management, 880 N. York Road, Elmhurst, Ill. 60126.

■

Comserv Corp. has enhanced its **AMAPS/3000** manufacturing and financial software for the Hewlett-Packard Co. HP 3000.

The release includes two new modules: the Lot Traceability System — designed to help U.S. Food and Drug Administration-regulated industries — and the Cost Management System. Other features include a decimal quantity enhancement and three-way match capabilities.

The 15-module AMAPS/3000 runs on all sizes of the HP 3000. Prices range from $85,000 for seven modules to $145,000 for all 15.

Comserv, 3400 Comserv Drive, Eagan, Minn. 55122.

■

Madic Corp. has ported its **Madic Integrated MRPII** software system to the Prime Computer, Inc. 2350 and 2450 superminicomputers.

The system consists of 19 manufacturing and financial modules, including general accounting, core manufacturing, advanced manufacturing and decision support systems.

The Madic system runs under Pick Systems' Pick operating system. It costs $50,000 for the Prime 2350 and $65,000 for the 2450.

Madic, 3960 Freedom Circle, Santa Clara, Calif. 95054.

From J.D. Edwards & Company, the industry specialist for IBM System/36 and System/38 computers, comes award-winning software.

Unsurpassed Documentation

Imagine the ideal in documentation...then see it at work with this exceptional system. Access information on-line or print as required. Develop video flowcharts, utilize the dynamic cross reference search. Data field help and where used facility are also at your fingertips.

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Put paper in its place by reviewing error reports, batch controls and daily journals on-line. Print general ledger reports just once a year or produce most traditional reports as frequently as needed. Now the choice is yours.

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Some of the features noted are available only for the IBM S/38.

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NEW PRODUCTS/SOFTWARE & SERVICES

California Software, Inc. has announced its **Netman Release 3.1** software for managing data centers, communications networks, information centers and other data processing environments.

According to California Software, the most significant enhancement is the ability to produce data center or network configuration diagrams on paper.

Also added were a user exit and screens to aid users in problem tracking, searching invoices, running reports and dynamically exchanging inventory.

Netman is said to be supported on IBM's MVS/TSO or CICS, VS1/TSO, VM/CMS and DOS-VS/CICS.

Prices range up to $45,500, the vendor said.

California Software, 3232 Nebraska Ave., Santa Monica, Calif. 90404.

Outlook Software, Inc. has released **Version VI** of its **Outlook/38** financial modeling package for the IBM System/38.

Version VI allows the entry of alpha test or alphanumeric information into the individual cells of an Outlook/38 spreadsheet. Version VI also provides the ability to sort permanently an Outlook/38 model. Text processing capabilities have been included for entering and defining spreadsheet report heading text.

Other enhancements include a page eject edit on spreadsheet rows, direct file access maps and the ability to submit the model update procedure and the product reorganization procedure to batch.

Version VI costs $4,500.

Outlook Software, Suite 117, 1 Woodfield Lake, Schaumburg, Ill. 60195.

Services

Plum Hall, Inc. has announced **"Preparing for ANSI C"** and **"Advanced Unix Programming,"** two two-day seminar offerings.

"Preparing for ANSI C" describes the new draft ANSI standard for the C programming language. It lists the differences from previous versions and describes how to write programs that are compatible with both.

"Advanced Unix Programming" is on the use of Unix system calls in applications and systems programs. It discusses differences in Unix versions and teaches how to design efficient and portable applications.

Both are available in-house and at public offerings. Each costs $450.

Plum Hall, 1 Spruce Ave., Cardiff, N.J. 08232.

■

Radiant Communications Corp. is offering three **Fiber-Optic VHS training videotapes**.

"Fiber-Optic Components and Systems: An Overview" covers topics including general background, fiber and cables, connectors and splices and potential markets. It sells for $185.

"How to Install Fiber-Optic Connectors" is a step-by-step guide that includes tips and potential pitfalls. It costs $145.

"Practical Testing of Fiber-Optic Systems and Components" is a how-to guide, covering topics from testing cable and connectors and splices to troubleshooting. It costs $100.

All three include workbooks.

Radiant Commmunications, 470 Ridgedale Ave., East Hanover, N.J. 07936.

MICROCOMPUTERS

Systems

Wells American Corp. has announced the **A-Star**, an IBM Personal Computer AT-compatible microcomputer.

The basic A-Star system includes a 1.2M-byte floppy drive, a switch-selectable 6- or 8-MHz Intel Corp. 80286 CPU, 512K bytes of user memory, a keyboard and a clock/calendar.

The A-Star micro comes with built-in multiuser network circuitry that, when combined with an optional network adapter card, will permit users of the A-Star to connect up to 255 units into a local-area network.

Continued on page 96

TEAMWORK.

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THE BEST PRICED XT220 IS NOW AVAILABLE WITH THE FASTEST ASYNC MODEM/MULTIPLEXER

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ADVANCED COMMUNICATIONS MODEM/MULTIPLEXER
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Carterfone XT-220
ENHANCED DEC COMPATIBLE TERMINAL
- 100% DEC Compatible
- Ergonomic Design
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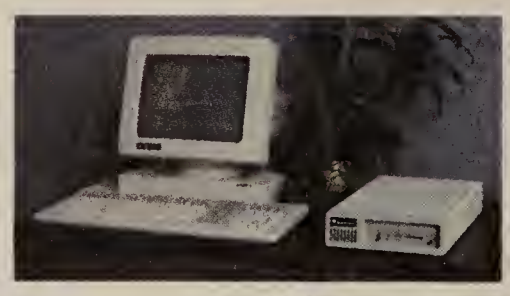
- Serial/Parallel Printer I/O
- Expanded Video Attributes
- RS232/RS423 or 20mA Communication



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Managing the Changing World of the Programmer
(Executive Report, April 7) What creates superprogrammers, and how to manage them. A look at the differences in programming in various environments like COBOL and 4GL; insights from the tops in the field. **Closing date March 21.**

New Semiconductor Technologies
(Executive Report, April 14) Silicon versus "glamour technologies," major research centers tell of efforts to downsize and speed-up chips. **Closing date March 28.**

Nonimpact Printers
(Product Spotlight, April 21) Focus on page printers; product comparisons; Japanese technology. **Closing date April 4.**

Software Maintenance
(Executive Report, April 28) Is it the programming issue of the century — and will two out of three programmers be doing exclusively maintenance by the year 2000? **Closing date April 11.**

Coming in May and June Executive Reports: Training End Users, May 5 (closing date April 18); Electronic & Voice Mail, May 19; (closing date May 2) In-house Publishing, May 26 (closing date May 9); BUNCH Companies, June 16 (closing date May 30); Integrated OA Systems, June 30 (closing date June 13).

Coming in May and June Product Spotlights: Disaster Recovery, May 12 (closing date April 25); Word Processing Software, June 2 (closing date May 16); Personal Computer Graphics, June 23 (closing date June 6).

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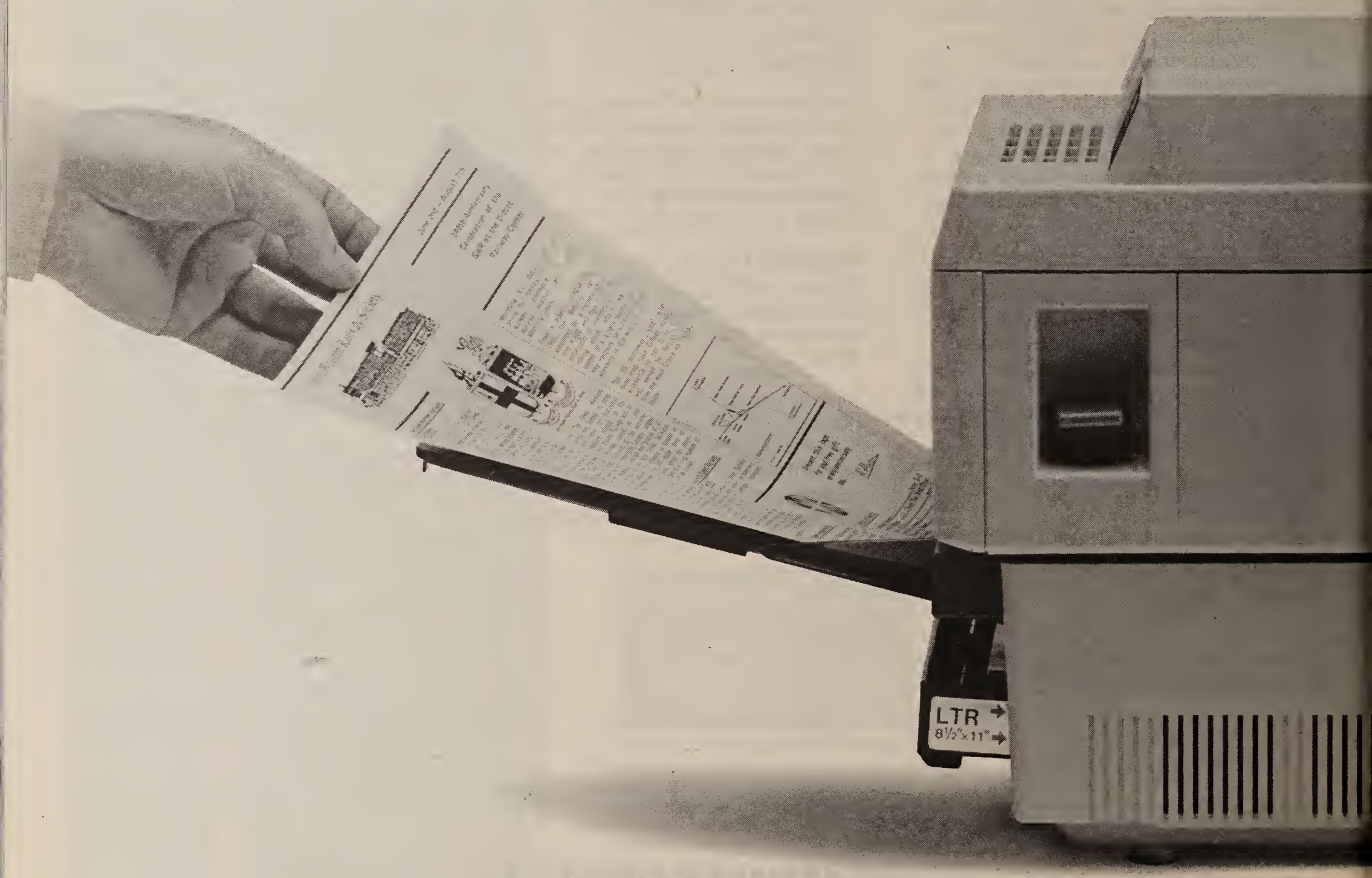

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Dot and Daisy.

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formerly corona data systems, inc.

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 92

The price of the A-Star is $1,695. The optional adapter card costs $295 for A-Star workstations, and for IBM and compatible workstations, the price is $495.

Wells American, 3243 Sunset Blvd., West Columbia, S.C. 29169.

■

Computer Dynamics, Inc. has announced the **Dynamic XT** microcomputer.

The Dynamic XT is built around the Intel Corp. 8088 CPU. It has a 135W power supply, 640K bytes of random-access memory on the motherboard; eight expansion slots; a double-sided, double-density floppy drive and controller; a keyboard; Microsoft Corp. MS-DOS 2.1 operating system and noninfringing Bios. According to the vendor, it runs IBM software.

Options include hard drives, video cards, serial, parallel or IEEE modes and printers.

The Dynamic XT costs from $695.

Computer Dynamics, Suite 365, One Technology Center, 2201 Donley Drive, Austin, Texas 78758.

Software applications

Project Software & Development, Inc. has announced a **125-Activity Model** of **Qwiknet**, its personal computer project management software for IBM Personal Computers and compatibles.

The model features capabilities including project planning and scheduling, cost and resource management, progress and summary reporting and "what-if" analysis. It uses pull-down menus, user-controlled windows, online Help and the firm's PSDI Mouse.

The Qwiknet 125-Activity Model costs $395.

Project Software & Development, 20 University Road, Cambridge, Mass. 02138.

■

ETS Center has announced **Lablmakr PC2**, a software package said to enable IBM-compatible personal computers to print labels using a standard dot matrix printer.

According to the vendor, labels can be printed in 52 different formats in sizes ranging from ½ in. by 2¾ in. up to 8 in. wide. Special formats, including cassette labels, are included.

Letters are printed in single or double size, vertically or horizontally, ETS Center said.

Lablmakr PC2 costs $49.

ETS Center, 35026A Turtle Trail, Willoughby, Ohio 44094.

■

Electrosonics has announced **Mortgage Loan Planner** (MLP), a computer loan amortization software program.

MLP features menu selection, Help screens, single or adjustable interest rates, balloons, miniballoons, equity draws and simple or exact interest. It also prints amortization reports as well as saving information to disk.

The program offers nine ways to schedule payments and six ways to calculate payments.

MLP costs $249.95. It runs on the IBM Personal Computer and compatibles.

Electrosonics, Suite 1, 36380 Garfield, Fraser, Mich. 48026.

■

Macmillan Software Co. has introduced **Asystant** and **Asystant+**, ready-to-run scientific software programs designed for developing advanced applications on personal computers.

Asystant offers complete data reduction, analysis and presentation graphics capabilties. Asystant+ adds data acquisition and includes built-in, interactive data manipulation, analysis and color graphics. Both run on IBM Personal Computers and compatibles including the Hewlett-Packard Co. Vectra.

Asystant costs $495. Asystant+ costs $895.

Macmillan Software, 630 Third Ave., New York, N.Y. 10022.

■

Banking Decision Systems has announced **PC/Bankmaster**, a version of its mainframe Bankmaster asset and liability management software system.

PC/Bankmaster runs on the IBM Personal Computer AT/370. It is an interest rate risk analysis and financial management system that includes asset and liability management, budgeting, profit planning and strategic planning functions.

According to the vendor, it is compatible with Bankmaster and can interface with personal computer spreadsheet and presentation graphics programs.

PC/Bankmaster is priced at $35,000.

Banking Decision Systems, 245 Winter St., Waltham, Mass. 02154.

Software languages

Impacc Associates, Inc. has announced **Interactive-C**, a C language development system for IBM Personal Computers.

Interactive-C consists of an interpreter supporting the C language standard along with an integrated command processor, full screen editor, source level debugger and execution profiler. It features a multiwindow user interface, compiled-module interface and variable use-before-initialization detection.

Interactive-C is source and library compatible with Lattice, Inc.'s Lattice C compiler.

Interactive-C costs $249.

Impacc Associates, P.O. Box 93, Gwynedd Valley, Pa. 19437.

"Not during a full moon I won't."

—Computer backup excuse #243

People can get very superstitious about when they do their computer backup. Especially if it gives them an excuse for not doing it at all.

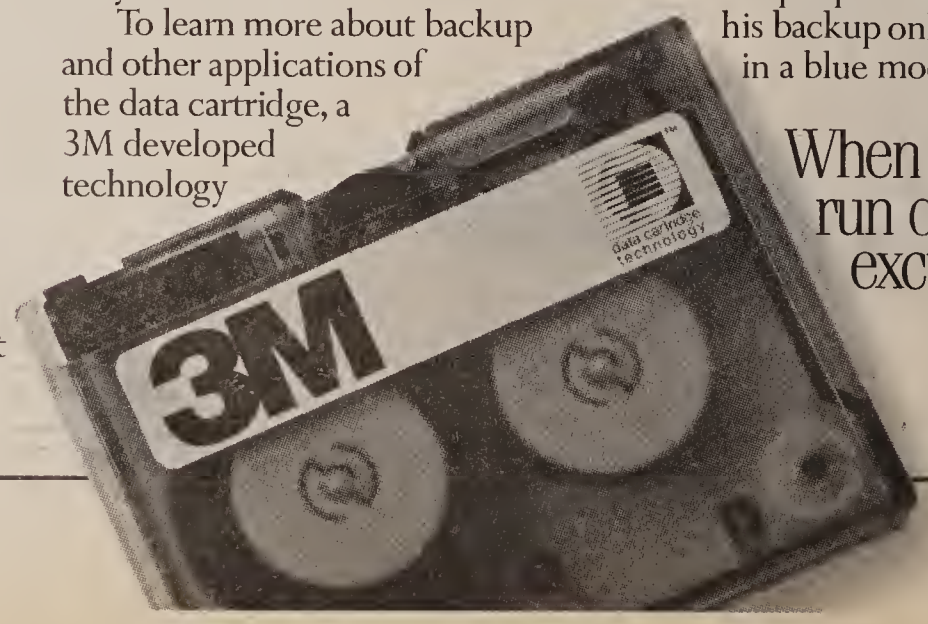
Because, after all, backing up is about as exciting as watching paint dry.

One way to take the curse off is to do it first thing in the morning. If you're one of those slow starters who has to have coffee and push some papers around for awhile when you get to work, that dead time could be perfect for backup.

As for how to do it, the floppy disk is fine if you have a limited amount of memory, and the data cartridge for 5 to 10 Mbytes or over.

To learn more about backup and other applications of the data cartridge, a 3M developed technology whose time has come, contact your local computer products dealer.

And maybe you won't be one of those people who does his backup only once in a blue moon.



When you run out of excuses.™

Sperry Corp. has introduced **Sperry PC/Pilot V2.1**, an enhanced version of its computer-aided instruction language.

The language is used to produce simulations, tutorials and training materials. According to the vendor, Sperry PC/Pilot V2.1 adds features such as animated sprite graphics, the use of 16 colors, mouse and videodisk controls and 1-sec. picture loading from disk.

The program runs on any of Sperry's personal computers or other Microsoft Corp. MS-DOS-based personal computers with 256K bytes of memory and one floppy disk drive.

It costs $135 in single-user quantities and $550 for a site license agreement.

Sperry, Jolly Road, Blue Bell, Pa. 19424.

Software utilities

Paradata Computer Networks, Inc. has introduced **Honeylink for the Wang PC.**

Honeylink is a Honeywell, Inc. VIP-7814 synchronous terminal emulator. The version that operates with the Wang Laboratories, Inc. Professional Computer features four simultaneous host sessions, local forms storage, file transfer and printer support.

It provides an applications program interface to its communications interface so users can write their own applications and communicate directly to the Honeywell computer system.

Honeylink for the Wang PC costs $695.

Paradata, 37655 Interchange Drive, Farmington Hills, Mich. 48010.

■

Polygon Associates, Inc. has announced **Poly-Share**, a software product said to allow personal computer and Digital Equipment Corp. VAX/VMS users to build a VAX-based library of personal computer applications.

Poly-Share lets users check text or binary file entries into and out of a library of standard data files, spreadsheets, programming macros and word processing documents.

Multiple libaries can be established, and library entries are cross-indexed by category, depositor name and date of entry.

Poly-Share is priced from $995.

Polygon Associates, 1024 Executive Pkwy., St. Louis, Mo. 63141.

■

Computer Access Corp. has introduced **Bluefish**, a text management software program for IBM Personal Computers and compatibles.

Bluefish can be used to build, modify and search knowledge bases. It reportedly can handle any ASCII file.

Bluefish, written in C and assembler, features English-language syntax, Boolean and range searches, full screen display, browse by match in context, wild card searches, permanent and reversible document deletion and the ability to index up to one million words.

Site licenses start at $750.

Computer Access, Suite 324, 26 Brighton St., Belmont, Mass. 02178.

Issco has announced its **Lotus-To-Tellagraf Link** software product said to convert Lotus Development Corp. 1-2-3 worksheet files into Tellagraf graphics software commands to produce mainframe graphics.

According to the vendor, the command file produced by the product can be uploaded to a mainframe, minicomputer or 32-bit workstation for processing with Tellagraf.

The Lotus-To-Tellagraf Link is available on diskette and operates on the IBM Personal Computer, Personal Computer XT, AT and compatible microcomputers. It costs $200.

Issco, 10505 Sorrento Valley Road, San Diego, Calif. 92121.

■

National Software Enterprises, Inc. has announced the **NSE-Code Generator.**

The generator is said to write Basic programs automatically. According the vendor, the generator can write either skeleton code or error-free code.

The programs it can generate include report writing, label printing, program menus, file maintenance, file updating and file conversion. It uses binary tree indexing, dynamic record allocation and ISAM routines.

The NSE-Code Generator runs on an IBM Personal

Continued on page 98

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NEW PRODUCTS/MICROCOMPUTERS

Continued from page 97

Computer or compatible with 64K bytes of memory and IBM PC-DOS with Basic or Basica. It costs $500.

National Software Enterprises, Suite C-210, 3260 Powers Ferry Road, Marietta, Ga. 30067.

■

Microplot has announced **Plotdev**, an installable IBM PC-DOS device driver said to add graphics commands to any program language.

Plotdev provides the user with the intelligent alpha terminal commands of a Digital Equipment Corp. VT100 plus the graphics commands of the Tektronix, Inc. 4010, 4014 and 4027 graphics terminals.

Plotdev costs $39.

Microplot, 659-H Park Meadow Road, Westerville, Ohio 43081.

S & K Technology, Inc. has announced **Strike**, a memory-resident spelling checker for IBM Personal Computers.

Strike was designed to be used with Micropro International Corp.'s Wordstar, Lifetree Software, Inc.'s Volkswriter, Peachtree Software, Inc.'s Peachtext, Software Publishing Corp.'s PFS:Write, IBM's Displaywrite, Multimate International Corp.'s Multimate or SSI Software's Wordperfect. It checks spelling as the user types and audibly alerts the user when an error is made.

Strike comes with a 49,000-word expandable dictionary.

Strike costs $29.95.

S & K Technology, 4610 Spotted Oak Woods, San Antonio, Texas 78249.

■

Wiley Professional Software has announced **Labsoft**, a software tool for acquiring, manipulating and analyzing real-world data on IBM Personal Computers in conjunction with the IBM Data Acquisition and Control Adapter.

Labsoft is said to offer complete language compatibility. It offers over 40 programming commands including asynchronous execution, analog and binary I/O, Schmitt trigger functions, counter functions, thermocouple functions and fast Fourier transform. It also includes graphics subroutines and an interface to Lotus Development Corp. 1-2-3.

Labsoft is available in Fortran and Basic for $350 each, and a C Language supplement is available for $75.

Wiley Professional Software, 605 Third Ave., New York, N.Y. 10158.

■

Straightforward has introduced **The Fortyone**, a software program said to enable any IBM PC-DOS computer to emulate the Hewlett-Packard Co. HP41CV hand-held computer.

According to the vendor, users do not have to convert or reprogram. They can use the HP reference documentation. Programs may be developed on The Fortyone for execution on the HP41. Users can run programs from the HP41 users' library without modification on their PCs.

The standard version of The Fortyone costs $115.

Straightforward, Suite 115, 15000 Halldale Ave., Gardena, Calif. 90247.

■

Accelerate 8/16, a hardware and software package designed to allow Digital Research, Inc. CP/M programs to run on Microsoft Corp. MS-DOS machines, has bowed from **The Software Toolworks** and **Intersecting Concepts, Inc.**

Accelerate 8/16 is based on the NEC Corp. V20 processor, which replaces the Intel Corp. 8088 processor in an MS-DOS computer, allowing it to run both 16- and 8-bit code. The software components are Media Master, a format conversion program from Intersecting Concepts; and Accel, an 8-bit CP/M emulation program from The Software Toolworks.

Accelerate 8/16 without the NEC V20 costs $89.95. With the NEC V20, it costs $99.95.

The Software Toolworks, 14478 Glorietta Drive, Sherman Oaks, Calif. 91423.

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Fox & Geller, Inc. has announced **Quickpack**, a product said to increase the processing speed of Ashton-Tate's Dbase programs.

According to the vendor, Quickpack increases the speed up to 85%. Quickpack also includes Quickclean, a utility that cleans and compresses Dbase memo files.

Quickpack costs $99 and runs on the IBM Personal Computer and compatibles.

Fox & Geller, 604 Market St., Elmwood, N.J. 07407.

■

UFO Systems, Inc. has announced the **UFO Process Monitor**, a product that is said to allow users to create interactive, animated graphics to run on the IBM Personal Computer.

The Process Monitor provides real-time control and monitoring of remote computers, intelligent instrumentation and control systems, including programmable controllers.

The package contains a graphics editor and library of process symbols.

The product also includes a local-area network for interfacing with remote systems.

The Process Monitor software, IBM Personal Computer AT with enhanced graphics adapter and display, mouse and capacitive touch screen costs $16,000.

UFO Systems, 300 Main St., East Rochester, N.Y. 14445.

■

Southside Systems has introduced **Symblor** and **Breakor**, two software products for use on an IBM Personal Computer.

Symblor is a machine language assembler. It supports Intel Corp. 8086/8088 machine language. It reportedly allows users to write Basic and Turbo Pascal subroutines.

Breakor is a memory-resident debugger said to allow users to break in at any time and trace a program.

According to the vendor, it saves and restores the current screen.

Symblor and Breakor are packaged together. They cost $30.

Southside Systems, P.O. Box 26554, Houston, Texas 77207.

■

Software Concepts, Inc. has announced **Formsmanager**, a software package for the IBM Personal Computer.

Formsmanager is said to use a printer's graphics mode to position printing to allow precise printing on a preprinted form.

Formsmanager is priced at $399.

Software Concepts, 1116 Summer St., Stamford, Conn. 06905.

Software data base management systems

Chorus Data Systems, Inc. has announced **Color Photobase**, a product said to enable users to recall and merge color photos with their data base information.

Color Photobase includes the image manager to save and recall pictures, PC-Eye video capture routines and screen formats. It runs with any IBM Personal Computer XT or AT.

Color Photobase software costs $495. It requires a graphics display card and 332 PC-Eye. The Developer II complete Color Photobase system, including a graphics display adapter, 12-in. monitor, red-green-blue camera, 332 PC-Eye video digitizer and software, costs $3,995.

Chorus Data Systems, P.O. Box 370, 6 Continental Blvd., Merrimack, N.H. 03054.

Software enhancements

Poc-It Management Services, Inc. has announced **Release 3** of its **Microman Project Control System** software for information services.

Microman is used to plan, schedule and track MIS activity. Release 3 adds a resource utilization report, a network diagram function and an accounting report that separates costs that can be capitalized under the Internal Revenue Service software development ruling.

A new report library and enhancements to the customized report writer are also features of Release 3.

Microman operates under IBM PC-DOS, Microsoft Corp. MS-DOS and Xenix, Unix and Digital Research, Inc.'s CP/M operating systems. It costs $1,445. Secondary site licenses cost $500.

Poc-It, Suite 512, 606 Wilshire Blvd., Santa Monica, Calif. 90401.

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NEW PRODUCTS/MICROCOMPUTERS

Executive Systems, Inc. has released **Xtree Version 2**, an enhanced version of its Microsoft Corp. MS-DOS and IBM PC-DOS file and directory organizer.

Xtree was designed to simplify file and directory handling on a floppy or hard disk by providing single keystroke commands.

New features include new command menus available from the directory display and the files display; an enhanced copy file function; a move file capability; print functions; alternate file displays; and optional sorting by size, time and date.

Xtree costs $49.95.

Executive Systems, Suite 305, 15300 Ventura Blvd., Sherman Oaks, Calif. 91403.

■

Kendrick & Co. has released **Version 3** of **Help for PC-DOS**, a program said to offer on-screen assistance for IBM PC-DOS.

Version 3 includes 60 screens of information about DOS commands. It features an on-line user's guide and a utility for printing out paper copies of the guide. It also allows users to add up to 20 customized screens.

Registered users of previous versions may upgrade for $10. Others may become registered users and receive a copy of Version 3 for $25. A site license is available for 50 cents per user plus a $200 registration fee.

Kendrick, 800 Eighteenth St. N.W., Washington, D.C. 20006.

Communications

Software Ventures Corp. has announced **Microphone**, a telecommunications program for Apple Computer, Inc. Macintosh computers.

Features of Microphone include the ability to access stock quotes hourly, to send and retrieve electronic mail and to record complete telecommunications sessions, remembering any series of keyboard commands and system prompts.

Microphone costs $74.95.

Software Ventures, Suite 220, 2907 Claremont Ave., Berkeley, Calif. 94705.

■

Comark, Inc. has introduced the **Smalltalk** half-card modem.

Smalltalk is said to be Hayes Microcomputer Products, Inc. compatible. It operates at 1,200/300 bit/sec. and is available with Quick Link telecommunications software.

Quick Link offers single-keystroke commands throughout and an 18-number dialing table. It operates on an IBM Personal Computer, Personal Computer XT, Personal Computer AT, PCjr, AT&T 6300, and most compatibles.

Smalltalk costs $155. Quick Link with Smalltalk costs $20.

Comark, P.O. Box 2608, Glendale Heights, Ill. 60138.

■

Star Gate Technologies, Inc. has introduced the **OC4400**, an adapter board with four RS-232 serial communications ports for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

The module is said to feature a remote panel with connectors compatible with the IBM asynchronous module. The board fits in any full-length PC slot and allows the computer to tie into modem phone lines and to monitor fire alarms and security systems. The OC4400 costs $470.

Star Gate Technologies, Suite 109, 33800 Curtis Blvd., Eastlake, Ohio 44094.

Software Publishing Corp. has enhanced its **PFS:Access** electronic communications software.

PFS:Access Version C.02 features support for the IBM Token-Ring network and PC Network via the IBM Asynchronous Communications Server program. It also offers direct support of 2,400 bit/sec. modems and transmission speeds up to 9.6K bit/sec.

PFS:Access costs $140.

Software Publishing, 1901 Landings Drive, Mountain View, Calif. 94043.

■

Metrabyte Corp. has announced the **Com-485** board said to allow IBM Personal Computer XT, AT and compatible computers to be networked over the RS-485 bus.

According to the vendor, the Com-485 will allow up to 32 different driver/receiver stations to communicate at 56K bit/sec.

Com-485 can be set up as a Com-1 or Com-2 standard interface port or at any other base address/interrupt level combination.

The Com-485 board costs $180.

Metrabyte, 254 Tosca Drive, Stoughton, Mass. 02072.

Data storage

Maynard Electronics has announced **Onboard**, a hard-drive system designed to fit into a single expansion slot of the IBM Personal Computer, Personal Computer XT and compatibles.

Onboard is available in both 10M- and 20M-byte versions. The 10M-byte version of Onboard costs $975. The 20M-byte version costs $1,195.

Maynard Electronics, 460 E. Semoran Blvd., Casselberry, Fla. 32707.

■

AST Research, Inc. has announced the Shortpak, a half-size memory expansion board said to add up to 576K bytes of random-access memory (RAM) to the IBM Personal Computer and compatibles.

Shortpak is available in three configurations: 64K, 256K or 384K bytes of RAM. It includes AST's Superpak utility diskette package. Shortpak costs $245 for 64K, $395 for 256K and $495 for 384K.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

■

Bering Industries, Inc. has introduced the **VKF-20**, the **VKR-10**, the **VKC 2010** and the **VKF-2020**, internal hard-disk add-in kits for the Hewlett-Packard Co. Vectra.

The VKF-20 offers 20M bytes of fixed hard-disk storage. The VKR-10 has 10M bytes of removable storage. The VKF-2020 combines two 20M-byte hard disks, and the VKC-2010 offers a 20M-byte fixed hard-disk and a 10M-byte removable storage.

The VKF-20 costs $1,150; the VKR-10, $1,650; the VKF-2020, $1,850; and the VKC-2010, $2,250.

Bering Industries, 1400 Fulton Place, Fremont, Calif. 94539.

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Complete & practical guide to DL/I batch programming with introduction to IMS/VS Online programming. 212 practical examples, 10 sample DL/I programs, 305 8.5x11 big pages, printed in two colors. IMS/VS Environment, Data Base Concepts and Terminology, DB/DC DL/I call usage, DL/I batch program structure, coding, testing and implementation, JCL Coding for DL/I data bases, BTS II Testing, Four most-used Data Base Access Methods, IMS/VS Utilities (DBDGEN & PSBGEN), Data Base Load, Logical Data Base and Secondary Index Design and Implementation and much more!

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KMW's Series II+ 3270 SNA/SDLC or Bisync

The Series II+ 3270 is designed to allow connection of most popular low cost CRTs and printers to an IBM mainframe in an interactive environment.

KMW's Series II+ 3287 Coax

The 3287 interface allows low cost ASCII printers, plotters and other devices to be locally attached to an IBM 3274/3276 control unit.

KMW's Series II+ 5251 Model 11/ 5291 Twinax

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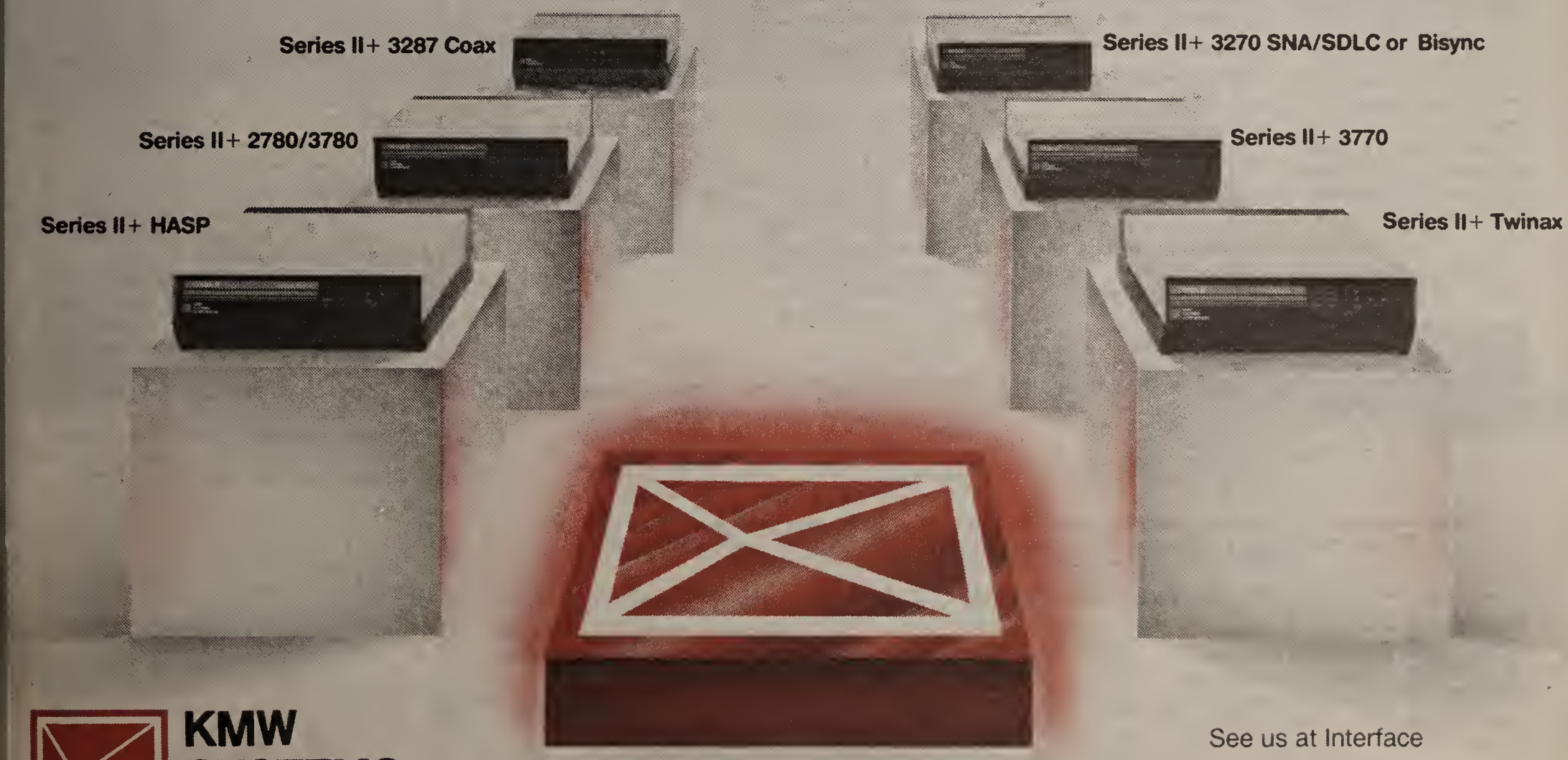

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NEW PRODUCTS/MICROCOMPUTERS

Kapak Design has announced that its Novo Drive 1000 is now compatible with the IBM Personal Computer AT.

According to the vendor, the Novo Drive 1000 is a 1M-byte, solid-state unit that is equivalent to a hard disk.

The device is controlled by firmware read-only memory and requires no special software.

On-board batteries provide a two-hour backup in case of main power failure.

The Novo Drive 1000 is priced at $395.

Kapak Design, 18784 Cox Ave., Saratoga, Calif. 95070.

■

Mountain Computer, Inc. has unveiled the **Filesafe 7000 series** of personal computer external hard-disk storage systems and tape back-up systems.

The storage devices are said to fit on top of an IBM Personal Computer's CPU, next to the monitor. Configurations available for the series include 20M-, 40M-, 68M- and 120M-byte hard disk drive models, according to the vendor.

The 20M- and 40M-byte versions can be upgraded with a 60M-byte tape backup.

The transfer rate for the hard disks is 5M byte/sec. For the tape, it is 90K byte/sec.

The tape backup system costs $2,195.

The hard disk drives range in price from $1,995 to $7,995. Combination versions are available.

Mountain Computer, 360 El Pueblo Road, Scotts Valley, Calif. 95066.

Peachtree Technology, Inc. has unveiled the **T-33E** backup subsystem.

The T-33E is said to use the existing external floppy port on any IBM Personal Computer, Personal Computer XT, Personal Computer AT or compatible.

It is fully compatible with Microsoft Corp.'s MS-DOS operating system, and it will back up 30M bytes of data.

The product comes with a handle and does not require any add-on boards.

The T-33E subsystem costs $795 and comes with two 10M-byte reels.

It is also available in an internal half-height configuration, which carries a price tag of $695, the vendor said.

Peachtree Technology, 3120 Crossing Park, Norcross, Ga. 30071.

CMS has added the **Perfect 60** to its Perfect series of hard-disk subsystems.

The Perfect 60 comes in two models: one for the IBM Personal Computer AT and one for the Compaq Computer Corp. 286. Both offer 60M bytes of storage and software said to break the 32M-byte file and volume barrier of Microsoft Corp. MS-DOS.

Both are eight-head, full-height, 5¼-in. drives providing an average access time of 30 msec and a 5M byte/sec. transfer rate. The Perfect 60 for the Compaq 286 includes a hard-disk controller.

The IBM AT-compatible Perfect 60 costs $3,695. The Compaq 286-compatible model costs $3,995.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

■

Univation, Inc. has announced the **Slimline Hard-Disk Subsystem** for the Apple Computer, Inc. Macintosh Plus.

The Slimline is said to offer both a 10M-byte removable cartridge and a 20M- or 30M-byte fixed Winchester hard disk drive.

Prices for the Slimline Hard-Disk Subsystem begin at $2,795.

Univation, 1037 N. Fair Oaks Ave., Sunnyvale, Calif. 94089.

■

CMS has announced the **Econo 60**, a 60M-byte internal hard-disk subsystem for the IBM Personal Computer and Personal Computer XT.

The subsystem includes controller and cables. It is a full-height, 5¼-in. drive with a 37 msec average access speed and a 5M bit/sec. transfer rate.

There is an optional software package designed to break the 32M-byte file and volume barrier of Microsoft Corp. MS-DOS.

Econo 60 costs $1,795. The optional software costs $120.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

Printers/Plotters/Peripherals

Microvitec, Inc. has introduced its **Definition 941-CN Color Graphics Monitor** designed for Verticom, Inc.'s M-16 graphics card.

The Definition 941-CN is a 20-in., noninterlaced monitor with a 0.31mm dot pitch and resolution of 1,365 by 870 pixels.

The monitor was designed for IBM Personal Computer and compatible-based computer-aided design and manufacturing and business graphics applications.

The Definition 941-CN sells for $1,995, including the interface cable.

Microvitec, 1943 Providence Court, Airport Perimeter Business Center, College Park, Ga. 30337.

■

Lexidata Corp. has introduced a high-resolution graphics display system for the IBM Personal Computer AT called **Personal Graphics 90**.

The system is said to provide flicker-free 1,280 by 1,024, 60Hz noninterlaced color or monochrome graphics. Initial configurations include a four-plane system capable of displaying 16 colors or gray levels and an eight-plane model capable of displaying 256 colors or gray levels.

Personal Graphics 90 features

Continued on page 106

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At 19,200 bps, speed alone can be blinding.

In the race to claim the fastest high speed modem, many modem companies advocate basing your buying decision on one thing: speed. What's happened, unfortunately, is that modem purchasers are getting so caught up in modem speed they're losing sight of the most important consideration.

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The big payoff.

Speeds of 19.2 kbps allow you to realize dramatic increases in efficiency and productivity. Without increasing expenses or staff resources. And these savings add up. Fast. With its standard 2-channel multiplexer, you can eliminate extra lines. For example, by combining two separate 9600 bps circuits into one leased-line at 19,200 bps typical savings for a New York to LA link are greater than $24,000 per year.*

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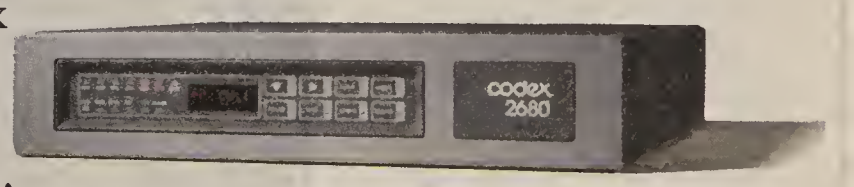
It's all perfectly clear.

Another important feature of the Codex 2680 is the fact that it is shipping right now. Not tomorrow. Now.

If you still have questions or would like a product demonstration, simply call **1-800-426-1212, ext.227.** Or write Codex Corporation, Dept. 707-227, 20 Cabot Blvd., Mansfield, MA 02048.



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MOTOROLA

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 104

Lexidata's Virtual Windows color window management allowing users to define, manipulate and display 15 viewports simultaneously. It also offers a full screen IBM color graphics adapter, which allows the user to access any AT application.

Prices for the four-plane system start at $7,995. The eight-plane version starts at $9,395.

Lexidata, 755 Middlesex Tnpk., Billerica, Mass. 01865.

■

Polaroid Corp. has announced a Zenith Data System, Inc./Heathkit version of its **Palette computer image recorder.**

The Palette film recorder is an interactive, software-driven system said to produce full-color presentation-quality prints, slides and overheads with a resolution up to 920 by 700 pixels. It accepts Polaroid 35mm instant slide film, conventional 35mm film, Polaroid Polacolor 3¼- by 4¼-in. print film and Colorgraph Type 691 instant overhead film, the vendor said.

The latest version is compatible with Zenith models Z-148, Z-150, Z-158 and Z-160.

The Palette costs $1,999.

Polaroid, 575 Technology Sq., Cambridge, Mass. 02139.

■

Devoke Data Products has introduced **Print Contender**, a printer sharing device designed for parallel equipment.

Print Contender is said to enable four personal computers to share one parallel printer as well as transmit parallel data up to 100 ft.

Print Contender has built-in line drivers that boost parallel signals beyond the standard 15-ft limitation.

Print Contender costs $495.

Devoke Data Products, 1500 Martin Ave., Santa Clara, Calif. 95050.

■

C. Itoh Digital Products, Inc. has introduced the **Chroma Pro** series of red-green-blue (RGB) monitors.

The series consists of the CM 1000 and CM 2000 monitors, a hidden control panel, a monochrome mode for word processing and a 16-color chromatic mode.

The CM 1000 features composite and RGB capability. The CM 2000 has a black screen. It is plug compatible with the IBM Personal Computer, Personal Computer XT and AT and the Apple Computer, Inc. Apple IIe series.

The CM 1000 costs $499. The CM 2000 costs $599.

C. Itoh, Suite 220, 19750 S. Vermont Ave., Torrance, Calif. 90502.

Quadram Corp. has announced its enhanced graphics adapter-compatible **Quadchrome Enhanced Display** monitor for use with its Quadega+ enhanced graphics adapter.

The Quadchrome Enhanced Display provides 640- by 350-pixel resolution in enhanced graphics adapter mode. It provides a 320- by 200-pixel resolution in color graphics adapter mode and can automatically switch between enhanced and color graphics adapter modes. It also has a green/amber text switch for users who prefer monochrome output for spreadsheets or word processing.

The monitor has a 13-in. screen with an 80-char. by 25-line display.

It is compatible with the IBM Personal Computer, Personal Computer XT, AT and compatibles.

It costs $795.

Quadram, One Meca Way, Norcross, Ga. 30093.

Juki Office Machine Corp. has introduced the **Juki 5510-Color** dot matrix printer.

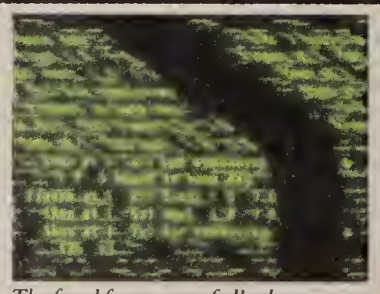
The Juki 5510-Color is said to offer seven colors from a four-color ribbon. It prints draft quality at 180 char./sec. and near-letter quality at 30 char./sec. It provides 96 ASCII characters, 96 italic characters and 11 international character sets. It features a built-in tractor feed, a 3K-byte buffer memory and a Centronics Data Computer Corp. 8-bit parallel interface.

The Juki 5510-Color costs about $650.

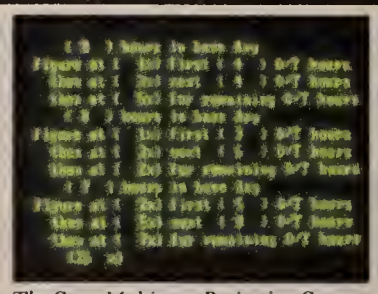
Juki Office Machine, 299 Market St., Saddle Brook, N.J. 07662.

Board-level devices

Microspeed, Inc. has announced that its **Fast88** Intel Corp. 8088-2-based accelerator for IBM Personal Computers is now compatible with the Lotus/Intel/Microsoft



The fixed frequency of all other projection systems relegates your data to limbo from frame to frame.



The Sony Multiscan Projection System with the auto-lock frequency system ensures letter-perfect transmissions.

Ever get the feeling that the video projector is undermining your corporate image? That projecting computer data is constantly subject to the whims of chance? And impossible to achieve without the aid of technical assistance? Well, join the crowd.

The fact is, this last and most critical link in the video presentation chain has been suffering from benign neglect—until now.

Sony has just devised a Multiscan video projector that will let you project computer data without the aid of any technical assistance or adjustments.

The key to this unit is a unique auto-lock feature which automatically senses where on the horizontal and vertical frequencies the computer signal is, and then locks in on it. And it interfaces perfectly with 80% of the computers on the market today. Including micros through mainframes. And it's plug-compatible with a 25-pin analog/digital connector and a 9-pin IBM-compatible connector.

NEW PRODUCTS/MICROCOMPUTERS

Above-Board Extended Memory Specification.

Fast88 offers up to a 60% performance increase. It is said to require no special software for installation and use. It also supports the use of an Intel 8087-2 numeric coprocessor.

Fast88 is priced at $149. A version with the NEC Corp. V-20 enhanced 8088 is priced at $189.

Microspeed, Suite 18, 4546 Peralta Blvd., Fremont, Calif. 94536.

Avas Corp. has added the **Telecomp 2000** to its Telecomp line of computer/video combiners.

The Telecomp 2000 is said to allow users to add full color video from a videocassette recorder, video camera, videodisk or other video source to the output of a microcomputer. It is a stand-alone device and requires no software driver. According to the vendor, it will interface with computers with transistor-transistor logic digital red-green-blue or composite video output.

Features include full window control, opaque or transparent overlay selection, switchable video source and digital-to-analog conversion.

A version combining monochrome computer output with any color video source costs $995. A version combining color computer with any color video source costs $1,595.

Avas, 196 Holt St., Hackensack, N.J. 07602.

Comark Corp. has introduced the **DP8800 System Processor**, an Intel Corp. 8088-based 8-bit microprocessor with 16-bit internal architecture.

The DP8800 is a single-board process control computer.

It features four serial ports, two parallel ports, four Intel SBX ports, 16 28-pin JEDEC random-access memory/read-only memory sockets, 16 timer/counters, 16 interrupts, mathematical and I/O processor and power-fail logic.

The DP8800 System Processor is priced at $1,095.

Comark, P.O. Box 474, 93 West St., Medfield, Mass. 02052.

■

Oasys, a division of **XEL, Inc.** has announced the **Oasys DS-32** high-speed 32-bit personal computer coprocessor board.

The DS-32 is said to be able to run AT&T Unix System V and virtual Microsoft Corp. MS-DOS while running MS-DOS on a personal computer. According to the vendor, the DS-32 fits in one slot of all IBM Personal Computer models. It includes a floating-point accelerator, two serial ports, a 16-bit interrupt-driven counter/timer and an optional memory management unit. Up to 2M bytes of on-board memory is available.

Prices for the Oasys DS-2 PC coprocessor start at $2,500.

Oasys, 60 Aberdeen Ave., Cambridge, Mass. 02138.

■

Boca Research, Inc. has announced **Tophat**, a memory board for the IBM Personal Computer AT.

The board is available with 128K bytes of memory for the enhanced AT with 512K bytes of random-access memory (RAM) and 384K bytes for the AT with 256K bytes of RAM on the system board. Each provides 640K bytes of RAM. Tophat boards are for conventional memory purposes only and can coreside with boards designed to use expanded memory.

The basic board, with 128K bytes of RAM using 64K-bit chips, costs $145. The board with 384K bytes of RAM, using 256K-bit chips, costs $195.

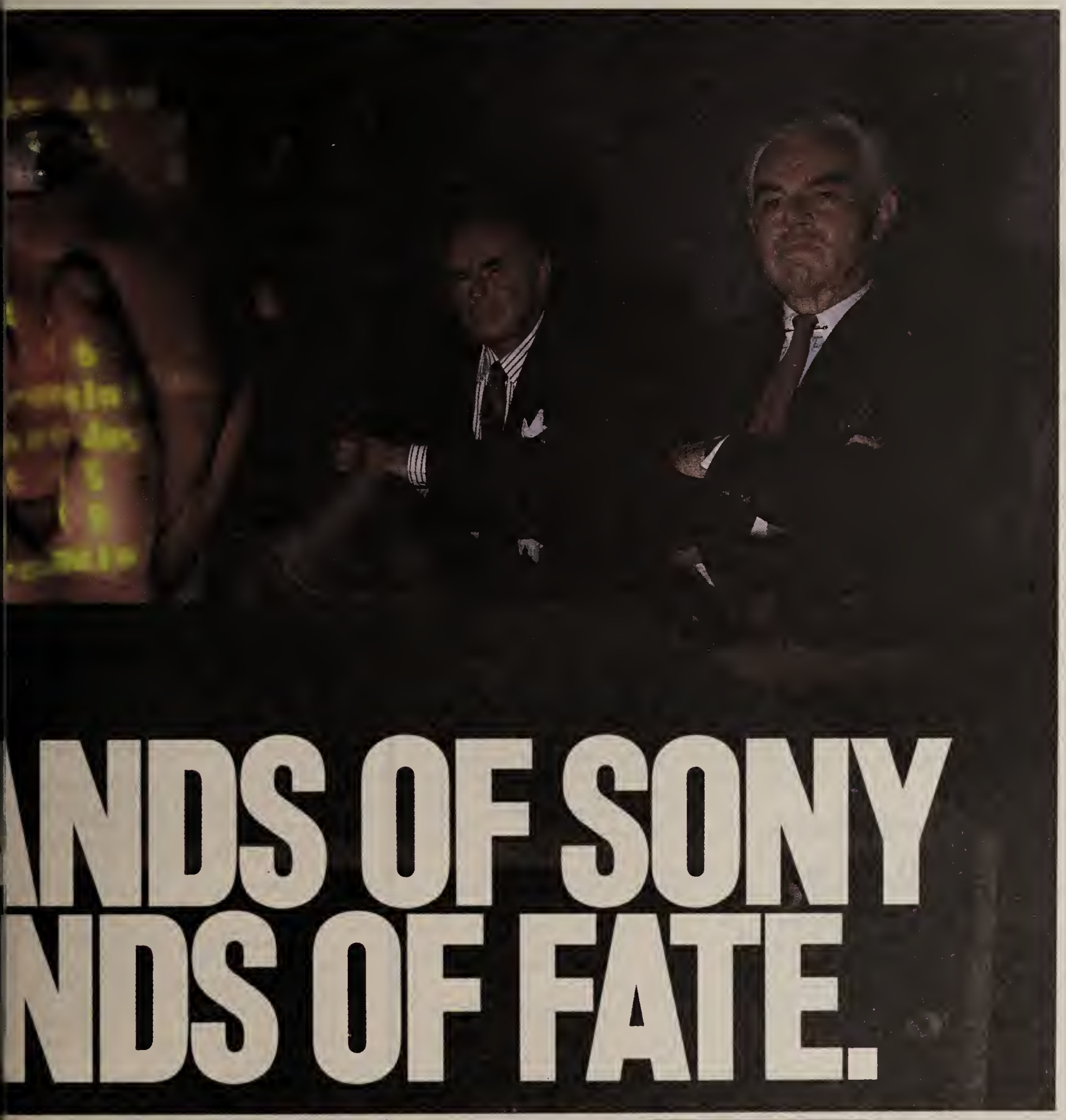
Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33431.

■

Nucleus, Inc. has released **Overthruster**, a personal computer accelerator capable of increasing the processing speed of IBM Personal Computers and compatibles.

The Overthruster board generates and synchronizes high-speed signals to the signals of the computer, ensur-

Continued on page 108



Furthermore, the Sony Multiscan projectors, with screen sizes adjustable from 72 to 200 inches, are so intelligently conceived, you can superimpose computer graphics over video images, as you would on a professional video monitor.

Sony makes a complete line of video projectors, including the new, High Resolution 900 Series for those who are not routinely projecting computer data with their video images.

For more information on the one and only line of headache-proof video projectors, or Sony's National Video Workshops, write the Sony Information Center, P.O. Box 6185, Department MS, Union, NJ 07083.

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NEW PRODUCTS/MICROCOMPUTERS

Continued from page 107

ing accuracy of I/O and real-time clock operations. Users may change speed during program execution without system lockup. A second switch provides the hardware reset function.

The list price is $195.

Nucleus, 17288 Santa Barbara, Fountain Valley, Calif. 92708.

■

Black Box Corp. has announced the **IBM PC/3270 Terminal Emulation Board** designed to enable an IBM Personal Computer to perform like an IBM 3278/3279 display station.

The board connects to a 3274/3276 cluster controller or a 4331 display printer/adapter. It reportedly offers Help menus and allows the user to reprogram the keyboard for 3270 operations.

The IBM PC/3270 Terminal Emulation Board costs $895.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241.

■

Printer Systems Corp. has announced its **PSC Model 5300**, an IBM 5250 terminal emulator said to allow the IBM Personal Computer, Personal Computer XT, AT and compatibles to communicate with an IBM System/34, 36 or 38.

The board fits into the half-card slot on the XT or portable and supports up to two host sessions and one Personal Computer session simultaneously.

The PSC Model 5300 costs $795.

Printer Systems, P.O. Box 6020, Gaithersburg, Md. 20877.

Services

Computer-Enhanced Meetings, Inc. has introduced **Group Computing**, a quarterly training publication devoted to organizing computer-enhanced meetings.

Group Computing is said to be a collection of resources for people who participate in working meetings. Sample topics include computer projection and monitor systems and the use of a personal computer.

The publication is electronic and printed. Data bases require an Apple Computer, Inc. 512K Macintosh or Macplus and Apple's Macdraw and Switcher and Living Videotext, Inc.'s software, Thinktank.

A year's subscription costs $345.

Computer-Enhanced Meetings, 2972 Clara Drive, Palo Alto, Calif. 94303.

Auxiliary equipment

Key Tronic Corp. has announced the **Key Tronic KB 3270/PC Keyboard**, designed to work with micro-to-mainframe IBM 3270 emulation packages.

The keyboard is said to have a 122-key layout and to be plug-compatible with the IBM Personal Computer, Personal Computer XT and AT. It offers 24 additional function keys not found on the regular IBM Personal Computer keyboard.

The KB 3270/PC costs $326.

Key Tronic, P.O. Box 14687, Spokane, Wash. 99214.

■

Datadesk International has announced **Supermacro Keys**, a keyboard/keyboard enhancer software combination.

Supermacro Keys combines the Datadesk PC 8700 AT-style keyboard with Borland International's Superkey keyboard enhancer software. The keyboard, which can be installed on IBM Personal Computers, Personal Computer XTs and ATs, offers features such as separate numeric keypad; status lights; and extra-wide control and return keys.

Borland's Superkey is said to allow users to customize and automate software, streamline typing activity and protect sensitive and confidential files.

Supermacro Keys costs $129.95.

Datadesk International, Suite A, 7650 Haskell Ave., Van Nuys, Calif. 91406.

■

Inmac Corp. has announced its **Space Saver Printer Stand**, a vertical CPU stand, and **Tilt and Turn**, a stand for color monitors.

The Space Saver Printer Stand holds a printer as well as more than 500 sheets of continuous forms. The CPU stand stores the CPU in a vertical position alongside a desk. The Tilt and Turn stand for color monitors is 12 in. by 12 in.

The printer stand and the vertical CPU stand cost $44.95 each. The color monitor stand costs $29.95.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95054.

■

Rainbow Technologies, Inc. has introduced the **Data Sentinel**, a user-installed data security system for the IBM Personal Computer, Personal Computer XT, AT and compatibles said to prevent unauthorized access to data files.

The system offers file encryption and compression and a hardware key that can allow up to three levels of access authorization.

The Data Sentinel is available in three packages for different size systems.

Prices range from $200 to $450.

Rainbow Technologies, Suite E, 17971 Skypark Circle, Irvine, Calif. 92714.

■

Intellicom Corp. has announced **Long-Link**, a personal computer-printer parallel interface extender.

Long-Link plugs into a parallel printer output and utilizes an RJ11 clip to extend the distance between

Continued on page 111

Announcing

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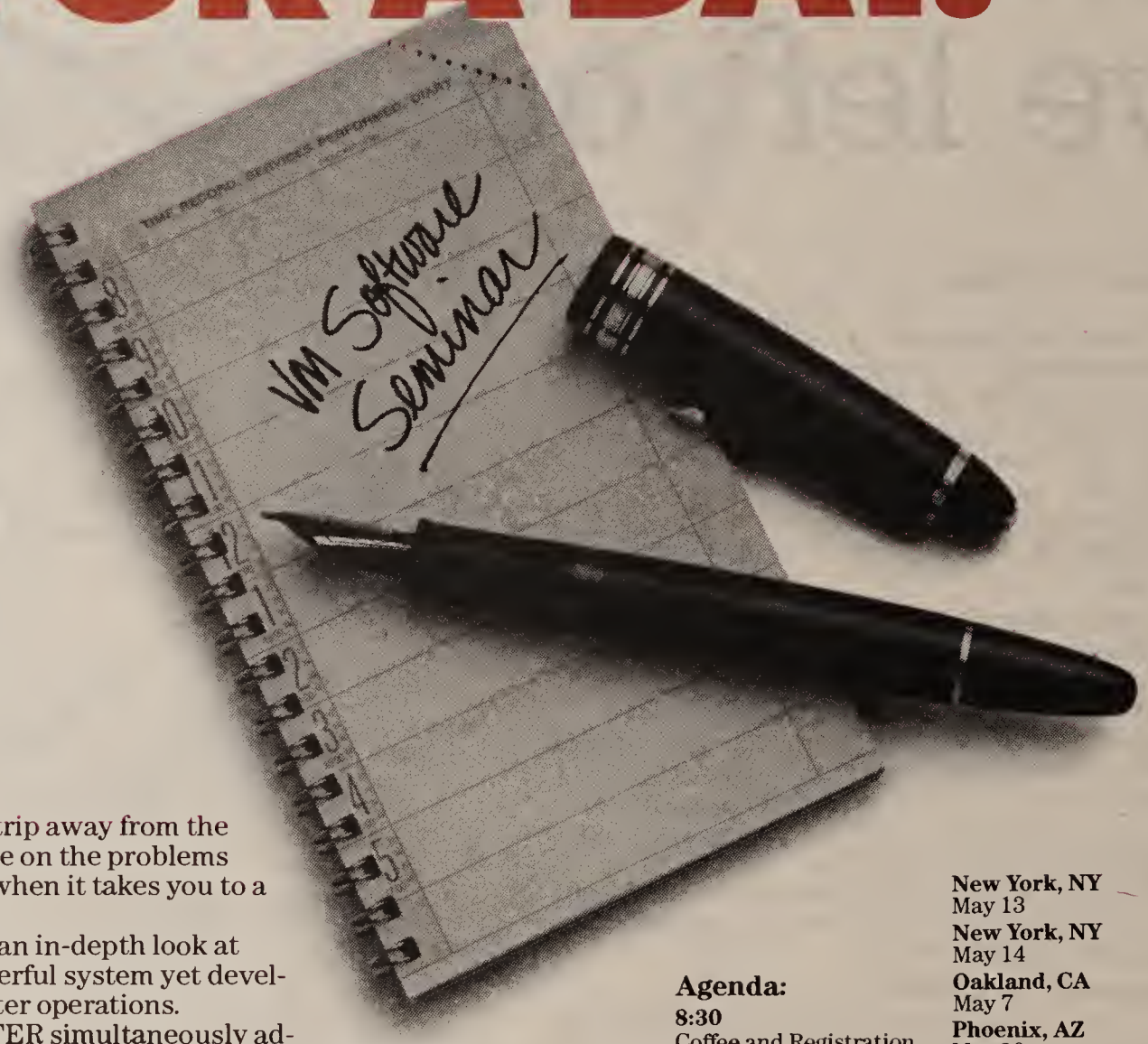

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You'll also get a chance to meet your fellow managers and system programmers. And get all the particulars on how they're handling situations similar to yours.

So don't wait. Come to a VM Software Seminar. And come out stronger than ever.

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VM SOFTWARE INC.

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Continued from page 108

the personal computer and printer up to 7,000 ft.

Long-Link transmits 1,200 char./sec.

The basic system consists of a transmitter and receiver, a UL-listed 9V AC power pack, adapters to connect four-wire, twisted-pair hookups and 50 ft of standard telephone extension cord.

The basic system costs $179.

Intellicom, 9259 Eton Ave., Chatsworth, Calif. 91311.

COMMUNICATIONS

Controllers

SBE, Inc. has announced the **SBE/MLAN-11** plug-in Ethernet local-area network front-end processor for Multibus systems.

The MLAN-11 can be used as a typical Ethernet node processor functioning as a slave Ethernet Multibus controller, or it can be packaged with a power supply to function as a stand-alone serial/parallel/small computer systems interface gate to the Ethernet highway, SBE said.

The board supports CCITT X.25, IBM Synchronous Data Link Control, High-Level Data Link Control, bisynchronous and asynchronous protocols.

It features 128K bytes or 512K bytes of no-wait-state, dual-ported dynamic random-access memory.

The SBE/MLAN-11 costs $1,495.

SBE, 2400 Bisso Lane, Concord, Calif. 94520.

Xpoint Corp. has announced the **Extension 36**, a dial controller said to link remote Xpoint workstations to IBM System/34, 36 or 38 host computers.

The Extension 36 is installed at the host site.

The remote Xpoint 5291 terminal communicates with the controller via a dial-up modem. They appear to the host as an IBM 5291 workstation, according to the vendor.

The Extension 36 and the XPoint 5291 terminal cost $1,249.

Xpoint, Suite 130, 5600 Oakbrook Pkwy., Norcross, Ga. 30093.

■

Integrated Marketing Corp. has announced **Data Manager**, a multiple-device spooler said to be able to connect any five RS-232 computers to a single printer.

Data Manager reportedly allows each computer to send data at 9.6K bit/sec. and is said to provide 64K bytes of memory storage to accept data from all five computers.

Data Manager costs $495, the vendor said.

Integrated Marketing, Suite H, 1031 E. Duane, Sunnyvale, Calif. 94086.

Protocol converters

RAD Data Communications, Inc. has announced its **Coax-to-Twisted-Pair Converter** (CTP).

CTP is said to enable an IBM 3270 terminal to operate over twisted-pair cable instead of coaxial cable. It allows transmission across distances of up to 1,000 ft over single twisted-pair wires and up to 2,000 ft with the IBM Cabling System.

According to the vendor, CTP offers lightning and power surge protection. It is hardware and software transparent.

CTP costs $49.

RAD Data Communications, 40 N. Van Brunt St., Englewood, N.J. 07631.

Multiplexers/modems

Astrocom Corp. has announced **Astrocom's Time Division Multiplexer** (ATDM) with an integral digital service unit/channel service unit for use over the AT&T Digital Dataphone Service.

The ATDM is a six-channel time division multiplexer designed to multiplex data from up to six synchronous devices onto a single 56K-byte transmission link.

Users can reportedly select the user port data rates from eight predefined settings.

Synchronous data rates range from 2,400 to 32K bit/sec.

The ATDM costs $1,890.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55107.

■

Honeywell, Inc. has added the **HFM-5210** to its line of RS-232-compatible asynchronous data modems.

The HFM-5210 is said to be an emission-free, fiber-optic device that can link any personal computer to a peripheral or mainframe or connect dumb or smart terminals to a mainframe. It offers full-duplex asynchronous operation at speeds up to 19.2K bit/sec.

The HFM-5210 costs $96.10.

Honeywell, Honeywell Plaza, Minneapolis, Minn. 55408.

■

Visionary Electronics, Inc. has released the **Visionary 1200XT** 300/1,200 bit/sec. stand-alone modem.

The modem is compatible with Hayes Microcomputer Products, Inc. units and contains its own battery backed-up memory. It has a separate printer port and its own internal clock/calendar.

Other features include auto-answer, autodial, autoredial, answerback, autologon and data capture and retrieval. The modem operates in originate or answer modes and transmits in either full- or half-duplex.

Prices range from $495 to $595.

Visionary Electronics, 141 Parker Ave., San Francisco, Calif. 94118.

■

Intermec Corp. has introduced the **Multi-Drop Concentrator** designed to simplify the task of implementing and managing a bar code data collection system.

The concentrator handles bidirectional data traffic between a host computer and up to 140 Intermec bar code readers and printers. It features 64K bytes of random-access memory

Continued on page 113

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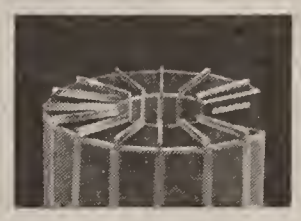

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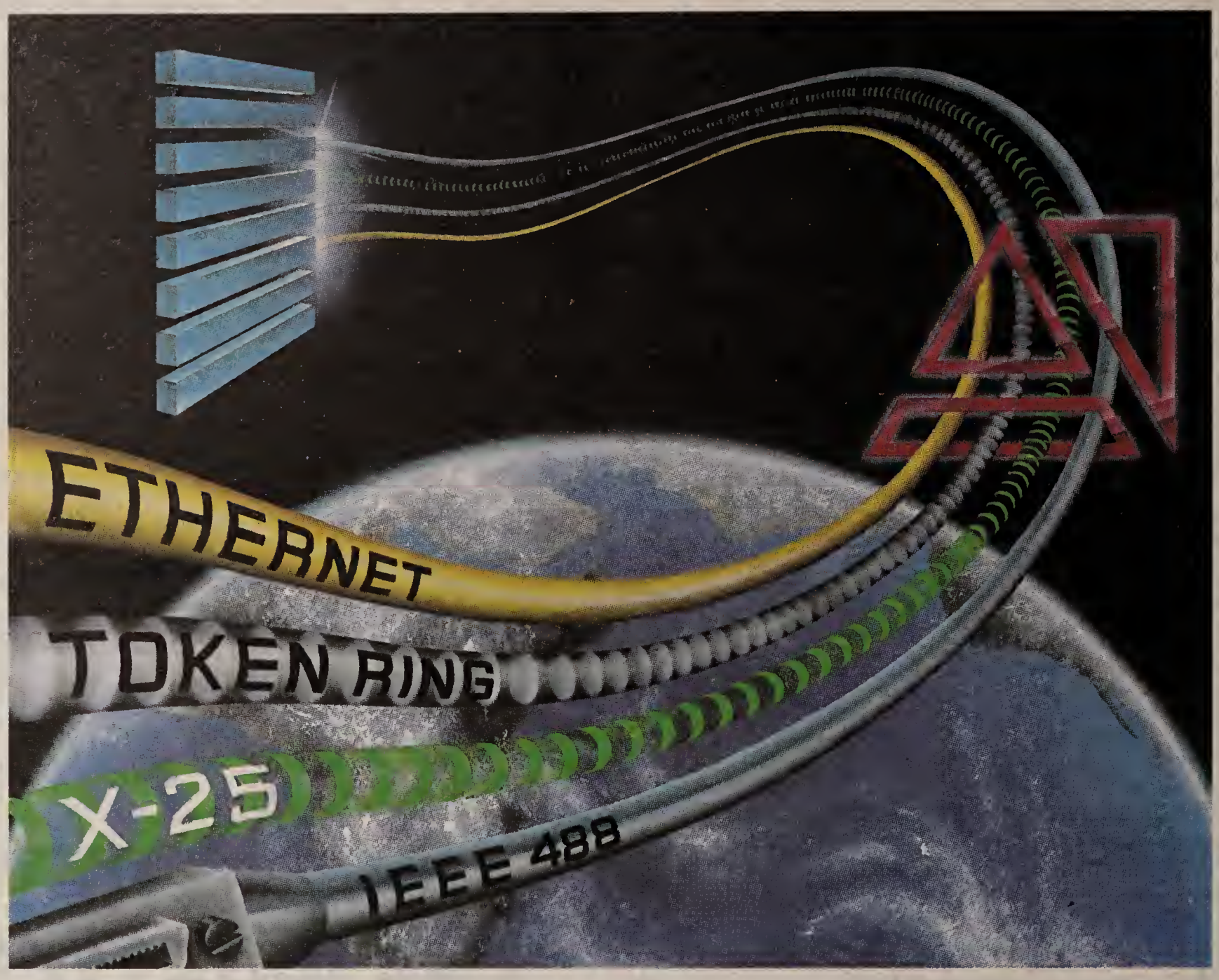

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Continued from page 111

with a 20K-byte buffer.

The concentrator costs $3,950.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynnwood, Wash. 98046.

■

Penril Datacomm has announced the **Cadet 1200** Hayes Microcomputer Products, Inc.-compatible AT&T 212A modem and the **Cadet 2400** 2,400 bit/sec. full-duplex modem.

The Cadet 1200 operates at 300 and 1,200 bit/sec. over the public switched telephone network or over leased lines. It can transmit and receive data simultaneously. It supports automatic and manual answer modes, has a telephone handset, a built-in speaker and an expanded autodial command set for call-progress monitoring.

The Cadet 2400 operates over the public-switched telephone network or leased lines and incorporates fallback modes.

The Cadet 1200 costs $289, and the Cadet 2400 costs $535.

Penril Datacomm, 207 Perry Pkwy., Gaithersburg, Md. 20877.

■

Automated Time Equipment Corp. has introduced the **ATEC FX-28A** fiber-optic multiplexer.

The multiplexer can simultaneously transmit and receive 28 computer data channels, the vendor said. Each channel is RS-232C compatible with transparent transmit, receive, carrier detect, data set ready, data terminal ready, clear to send and ready to send handshaking control signals.

Using the FX-28A, terminal clusters, printers, modems and other asynchronous RS-232C devices can be located up to 10 miles from the host with data transfer rates up to 19.2K bit./sec.

The ATEC FX-28A costs $1,895.

Automated Time Equipment, P.O. Box 1903, Brentwood, Tenn. 37027.

Test Equipment

Electrodata, Inc. has introduced **read-only memory** (ROM) **packs** for High-Level Data Link Control (HDLC)/X.25, Synchronous Data Link Control/Systems Network Architecture (SDLC/SNA), Programmed Airlines Reservation System/International Passenger/Programmed Airlines Reservation System, bisynchronous/EBCDIC, bisynchronous/ASCII, extended asynchronous, upload/download and general purpose applications for its CTS 3 Programmable Data Communications test set.

The packs are said to provide understandable mnemonic decoding of line activity and routines for performing interactive network tests.

The HDLC/X.25 and SDLC/SNA packs cost $200 each. The others cost $150 each.

Electrodata, 23020 Miles Road, Bedford Heights, Ohio 44128.

Auxiliary equipment

Shure Brothers, Inc. has introduced the **Model 503BG Close-Talk**, a gooseneck-mountable dynamic microphone designed for computer voice-recognition applications.

The Model 503BG is said to offer a frequency curve that provides a flat response over the 100Hz to 7,000Hz frequency spectrum when used within five centimeters of the sound source. It also features an integral humbucking coil for eliminating background electrical hum.

The Model 503BG microphone costs $60.

Shure Brothers, 222 Hartrey Ave., Evanston, Ill. 60202.

SYSTEMS & PERIPHERALS

Processors

McDonnell Douglas Computer Systems Co. has announced a **resilient system option** for its M9200 series of relational data base management systems.

The option links two identically configured M9200 systems together in a symbiotic data base relationship. One system is used for application processing, and the other maintains parallel up-to-date copies of critical files.

M9200 large business systems range in price from $89,950 to $399,500. The intersystem channel costs $40,000. Resilient port switches cost from $12,075 to $116,725.

McDonnell Douglas Computer Systems, 17481 Red Hill Ave., Irvine, Calif. 92714.

■

Force Computers, Inc. has introduced the **Miniforce** series of Motorola, Inc. VMEbus-based multiuser computer systems.

The systems offer Eyring Research Institute, Inc.'s real-time, multiuser, multitasking PDOS operating system on VMEbus-based systems. Miniforce features include a Motorola 68000 microprocessor, two to eight RS-232 serial ports, 512K bytes to 2M bytes of main memory, 25M-byte or 50M-byte Winchester drive, 1M-byte floppy drive and two to six extra VMEbus-based slots.

Prices range from $8,385 to $14,895.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

CAD/CAM/CAE

Context Corp. has introduced the **Context Series** of automated documentation workstations for the electronic technical publishing industry.

The workstations are said to integrate text and graphics from computer-aided engineering, computer-aided

Continued on page 114

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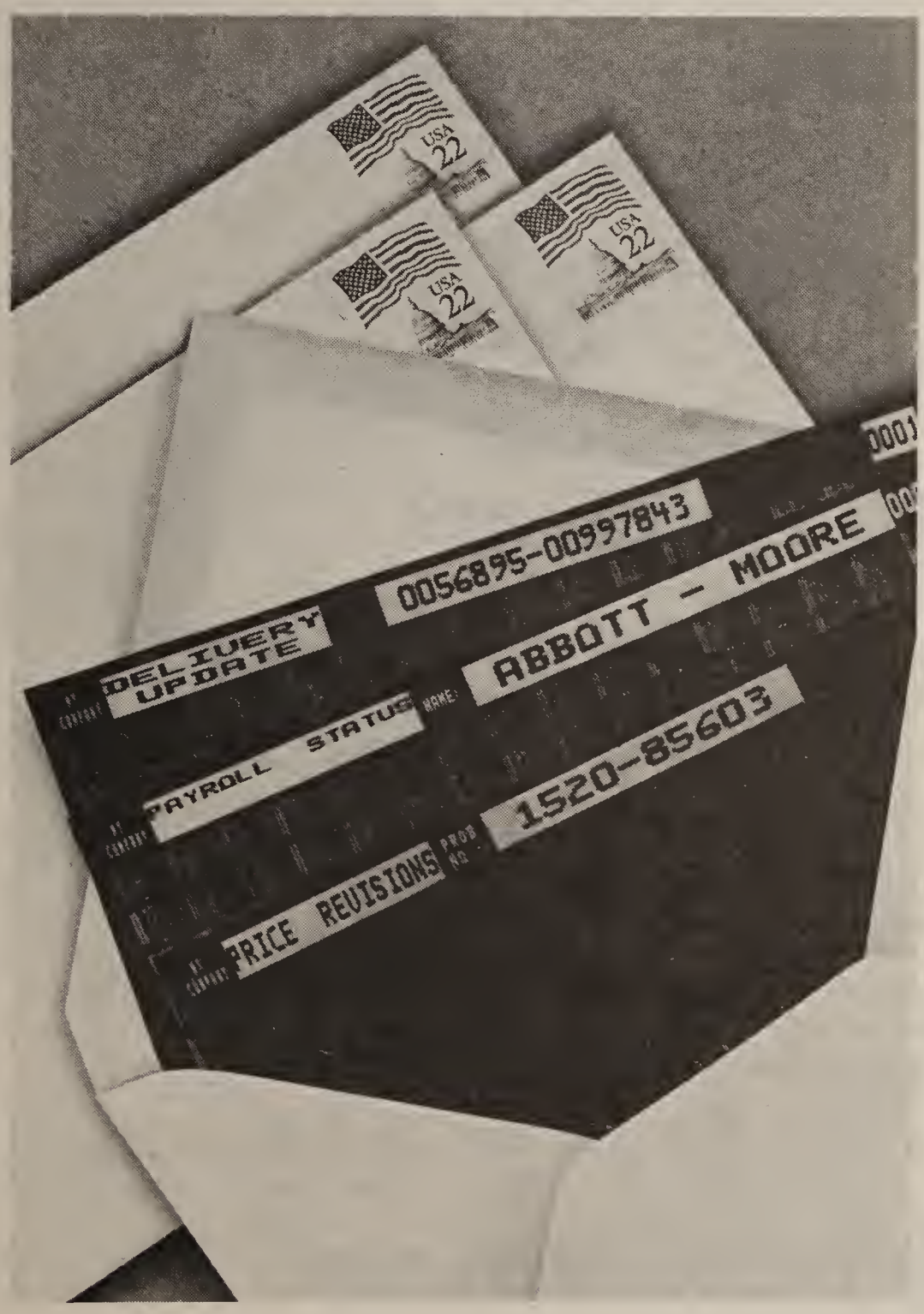

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Continued from page 113
design and computer-aided software engineering design tools.

Hardware consists of one or more Apollo Computer, Inc. Domain workstations, mass storage and a laser printer. Basic software includes DOC, the system's text editor and formatter, and Piced, the system's picture editor. The system offers both function keys and a mouse, pop-up menus and an electronic mail system.

Prices start at $16,900.

Context, 8285 S.W. Nimbus Ave., Beaverton, Ore. 97005.

Graphics systems

Genigraphics Corp. has announced the **Masterpiece 8770** imaging system.

The 8770 is a digitally driven film recorder said to offer 8,000-line resolution. It is used to capture images on color or black-and-white, 35mm, 46mm, 4- by 5-in., 7- by 9-in. and 8- by 10-in. film. The system is compatible with any Genigraphics Series 100 console driven by a Digital Equipment Corp. RSX-11-M Version 4.1 or later operating system for all DEC PDP-11 Q-bus computers.

The Masterpiece 8770 35mm basic unit is priced at approximately $69,000.

Genigraphics, P.O. Box 591, Liverpool, N.Y. 13088.

Terminals

Intecolor Corp. has announced the **Intecolor 920** terminal for factory automation applications.

The 920 is Digital Equipment Corp. VT220 compatible. It includes a Colorkey feature that is said to add color to black-and-white software automatically. It offers a 19-in. screen with either 80- or 132-col. displays and provides any of eight foreground colors on any of eight background colors, selectable by character.

The 920 terminal costs $2,195.

Intecolor, 225 Technology Park, Intecolor Drive, Norcross, Ga. 30092.

■

Perfect Terminal, Inc. has announced the **P-210**, a terminal said to emulate the Data General Corp. 210.

The terminal features a 14-in. screen, 123-col. capability, 32 programmable function keys, soft setup and a buffered printer port. It offers an RS-232C bidirectional interface.

The P-210 costs $795.

Perfect Terminal, 3319 Seldon Court, Fremont, Calif. 94538.

■

Ann Arbor Terminals, Inc. has introduced the **VDC-1200 Video Display Controller**, designed to convert computer-generated data into composite video.

The VDC-1200 conforms to ANSI standards X3.4, X3.41 and X3.64 and is compatible with the Digital Equipment Corp. VT52, VT100 and VT200 terminals. It generates a display format of 80 char. by 24 lines. Controller input is RS-170 compatible and is said to be capable of driving up to 10 remote monitors. Controller input is RS-232 compatible. Rates up to 19.2K bit/sec. are accepted.

The VDC-1200 costs $695.

Ann Arbor Terminals, 6175 Jackson Road, Ann Arbor, Mich. 48103.

Printers/plotters

Honeywell, Inc. has announced the **Visigraph** monochrome printer/plotter.

Visigraph is a portable desktop device said to offer both a video and digital interface. It accepts composite or red-green-blue video with separate composite synchronous or separate horizontal and vertical synchronous. It works with a range of video sources with up to 1,280- by 1,024-pixel resolution.

The maximum print width is 11.7 in. It can print on single-sheet, fanfold and roll forms and can make transparencies.

The Visigraph costs $7,950.

Honeywell, P.O. Box 16688, Denver, Colo. 80216.

■

Enter Computer, Inc. has announced the **Model SP1200** plotter for use with microcomputer-based computer-aided design and engineering systems to produce from size A to size E engineering and architectural drawings.

The plotter can be directly attached to a workstation, or it can serve a number of users on a local-area network. The single-pen SP1200 emulates the DM/PL plotter language from Houston Instruments Co. It comes with an RS-232C serial interface and operates between 300 and 9.6K bit/sec.

The Model SP1200 with standard 14K-byte buffer costs $4,995. Metal stands are available for $250.

Enter Computer, 6867 Nancy Ridge Drive, San Diego, Calif. 92121.

Components

Emulex Corp. has announced the **UC04** Q-bus host adapter, said to emulate Digital Equipment Corp.'s Mass Storage Control Protocol and connect DEC's Microvax I and II, Micro/PDP-11 and LSI-11 to small computer system interface (SCSI).

The UC04 features adaptive direct-memory access, block mode direct-memory access, optical disk drive support, an SCSI protocol controller, nonvolatile static random-access memory configuration and a large data buffer, according to Emulex.

The UC04 has a 20K-byte data storage buffer.

It is priced at $1,800, the vendor said.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Auxiliary equipment

Frontline Products has added the **Computree-III**, computer system stand to its Computree line of products.

The Computree-III features a 24-in.-wide printer stand.

The product offers pivot, swivel and rotating tables that are adjustable by 1-in. increment spacers.

The Computree-III costs $499.95, according to the vendor.

Frontline Products, Suite 200, 1915 W. Glenoaks Blvd., Glendale, Calif. 91201.

■

Devoke Data Products has introduced the **Plotter Center** plotter and supply stand.

It features a supply drawer with a removable tray said to hold up to 40 plotter pens in a vertical position.

Plotter Center is available in a stand-alone model with casters for $219 or a tabletop model for $133.

Devoke Data Products, 1500 Martin Ave., Santa Clara, Calif. 95050.

■

Sigma Information Systems has announced the **SA-H152**, a refrigerated industrial chassis cooled entirely by a closed refrigeration system.

The chassis was designed to allow the operation of computer systems in environments normally unacceptable for commercial equipment. Integrated into the enclosure is a thermostatically controlled freon-based air-conditioning unit that cools and protects the internal modules of the computer chassis.

The chassis includes an 8-row, quad Q-bus backplane, compatible with Digital Equipment Corp.'s Q-bus processors and modules. It is available with 16 Q22 slots or 13 Q22 slots and three CD slots.

The SA-H152 costs $4,500.

Sigma Information Systems, 3401 E. La Palma Ave., Anaheim, Calif. 92806.

PRICE REDUCTIONS

Univation, Inc. has lowered the prices for its **PC Turbocharger** accelerator boards.

The PC Turbocharger is said to increase the processing speed of the IBM Personal Computer and Personal Computer XT, Compaq Computer Corp. Portable and other compatibles from two to four times.

It offers compatibility with the Lotus/Intel/Microsoft Expanded Memory Specification and the AST Research, Inc. Enhanced EMS.

The 640K-byte PC Turbocharger now costs $695, the vendor said.

With Intel Corp. 8087 math coprocessor, the product costs $1,195, according to Univation.

Univation, 1231 California Circle, Milpitas, Calif. 95035.

■

JDL, Inc. has reduced the prices of its **JDL-750C** business graphics printer and its OEM model, the **JDL-750A**.

The JDL-750C is an A/B-size, letter-quality, color dot matrix printer compatible with the IBM Color Matrix Printer and the Diablo Systems, Inc. 630. The new price is $1,695.

The JDL-750A, which features Diablo 630 compatibility and provides for printer driver and font customization, now costs $1,650, the vendor said.

JDL, Suite 104, 2801 Townsgate Road, Westlake, Village, Calif. 91361.

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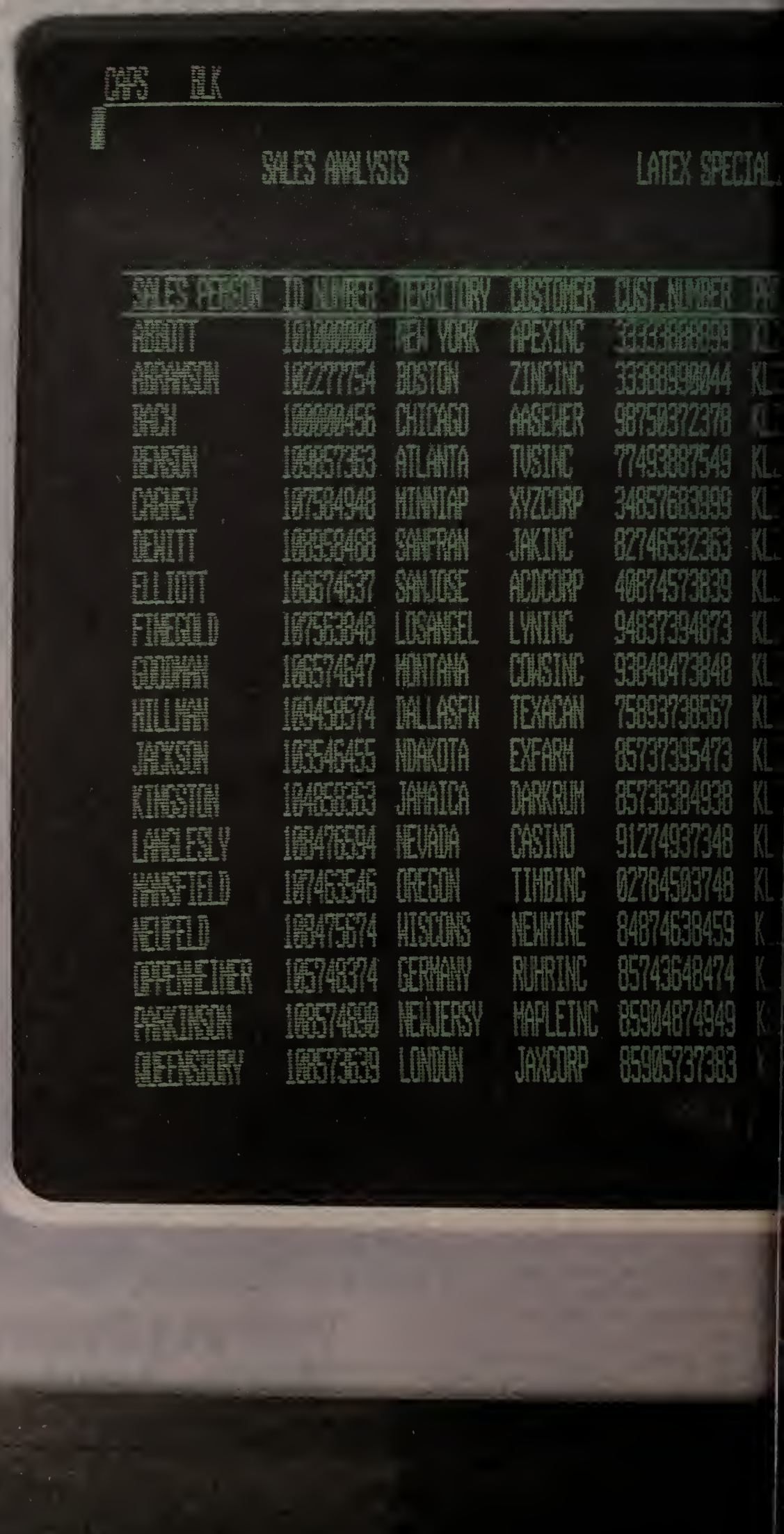

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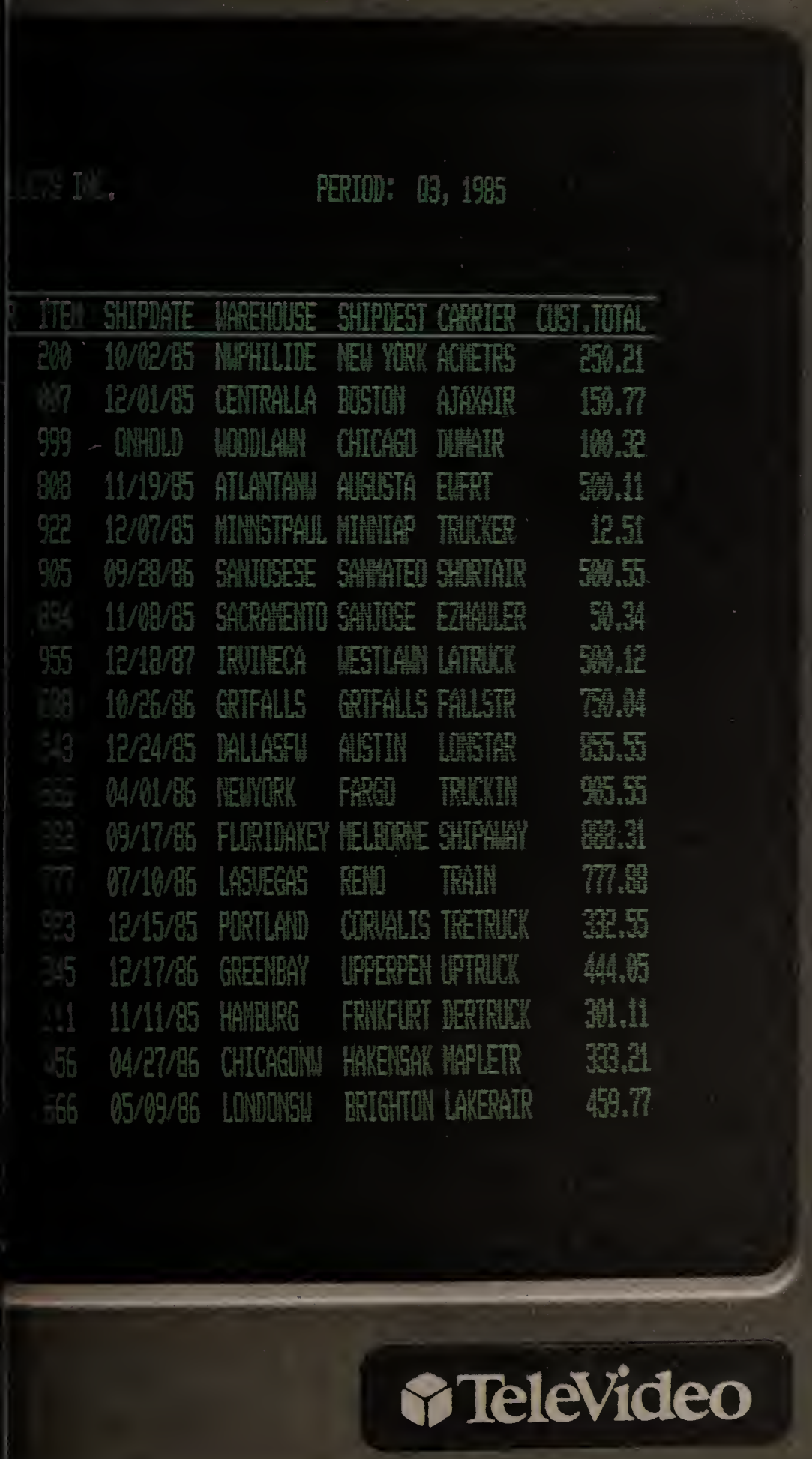

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NEWS

WORLD DIGEST

Computerworld
News Service

BRUSSELS — ITT Europe earlier this month introduced its Office 2000, a line of office automation products that includes enhancements to ITT's digital private branch exchange and its digital telephones. Also announced were new processors for networking and an integrated voice/data local-area network for small companies.

The products are based on an open architecture, a move that ITT Europe President Daniel P. Weadock said was undertaken in response to a survey of user needs.

STOCKHOLM — Sweden has adopted regulations banning the reexport of foreign-made goods that are subject to export restrictions in their country of origin. The measure, scheduled to take effect June 1, is intended to prevent the use of Swedish territory for smuggling Western high-technology equipment to Communist countries.

The action comes after what Swedish officials said is an apparent increase in attempts to use Sweden as a transit point for technology smuggling. The smugglers, they added, are using increasingly sophisticated methods to avoid breaking the letter of Swedish law.

STOCKHOLM — L. M. Ericsson, the Swedish telecommunications company, has signed a contract worth $5.6 million to supply Hong Kong Cable and Wireless with a digital exchange for use in the city's new international switching center. The exchange, said to be one of the largest of its kind, will handle international telecommunications traffic into and out of Hong Kong and will serve as a node for Far Eastern telephone traffic.

PARIS — IBM France has reached an agreement with Parisbas, a nationalized French bank, and Sema-Metra, a French software and services firm, to provide a value-added electronic service in France. The venture could pave the way for a liberalization of the highly regulated French telecommunications market, if the state-run Postal Telephone and Telegraph authority gives its go-ahead.

The three partners plan to create a company in coming months, according to Paribas officials, in which IBM France will have a minority share. But they added that they do not expect the new firm to market its services for 1½ to two years. That period will be needed, the officials said, in order for the firm to overcome administrative and political hurdles and to develop the necessary protocols and applications.

PARIS — After four years of running in the red, the French nationalized computer maker Groupe Bull recently announced a net profit of $15.7 million for 1985, compared with a 1984 loss of $70 million. International sales accounted for 36% of the $2.3 billion in 1985 revenue. Revenue in 1985 was up 18.5% over 1984, while investment in research and development remained steady. In 1984 Bull spent 10% of its revenue on R&D.

TOKYO — In the coming fiscal year, Nippon Telegraph and Telephone Corp. (NTT) expects profits of $1.94 billion, an 18% jump from profits predicted for the current period. Revenue for the new fiscal year, NTT's second year of privatization, has been estimated to rise 4.6% to $29.9 billion.

OSAKA, Japan — Matsushita Electric Industrial Co., a 31-company conglomerate, recently reported after-tax profits of $1.34 billion for fiscal 1985, an increase of 3.4%. It also said revenue was up 7% last year to total $28.1 billion.

Revenue from domestic markets in 1985 totaled $14.2 billion, up 5% from a year ago, while revenue from international markets totaled $13.9 billion, up 9%, Matsushita said.

TORONTO — Computerland Corp.'s 66 stores in Canada were recently purchased by Computer Innovations Distribution, Inc., a chain that will convert its own 35 locations to Computerland stores. The conversion will result in a 101-store Computerland chain that Computerland officials estimated will sell $177 million worth of products in the year beginning March 29, when the deal becomes effective.

Publicly held Computer Innovations of Toronto purchased the franchisee licenses and store assets for $14 million and 2.5 million shares of its stock. The money and stock will be divided among the owners of the franchises based on the value of each individual store.

SEOUL, South Korea — South Korean manufacturer Hyundai Electronics Industries Co. has reportedly concluded an agreement to produce erasable programmable read-only memory (EPROM) chips for General Instrument Corp. of Hunt Valley, Md., the chip's developer. Hyundai reportedly will provide General Instrument with $400 million worth of chips over the life of the five-year agreement.

South Korean electronics industry sources said Hyundai's contract with General Instrument is bigger than any previous deal between a South Korean semiconductor vendor and a U.S. vendor. They also said the contract indicates the growing interest of U.S. semi vendors in South Korea's technological expertise.

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CALENDAR

WEEK OF MARCH 23

MARCH 24, CHICAGO — **How to Manage Your Toughest Disaster Recovery Planning Issues.** Contact: Kathy Haupers, Chi/Cor Information Management, Inc., 10 Riverside Plaza, Chicago, Ill. 60606.

MARCH 24-26, CHICAGO — **Systems One Conference and Exposition.** Contact: Michael A. Tew, Technical Activities Department, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

MARCH 24-26, LAS VEGAS — **Fifth Annual International Spectrum USA.** Contact: Amy Krainock, International Data Base Management Association, Suite 104, 9740 Appaloosa Road, San Diego, Calif. 92131.

MARCH 24-26, LAUREL, MD. — **Association for Computing Machinery's Conference on Ada Use in Focus: Practical Lessons in Perspective.** Contact: Connie Finney, Johns Hopkins University, Applied Physics Laboratory Computer Society, Johns Hopkins Road, Laurel, Md. 20707.

MARCH 24-27, LOS ANGELES — **Software Development for Government.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903. Also being held March 31 to April 3 in Atlanta and April 14-17 in Denver.

MARCH 24-27, SAN FRANCISCO — **Personal Computer Networks in Government.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903. Also being held April 8-11 in Dallas.

MARCH 24-27, SINGAPORE — **Artificial Intelligence '86 Conference: AI and its Applications — A State of the Arts Review**. Contact: John Tagler, Elsevier Science Publishers, 52 Vanderbilt Ave., New York, N.Y. 10017.

MARCH 24-28, WASHINGTON, D.C. — **James Martin's Productivity Seminar.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

MARCH 26-27, CAMBRIDGE, MASS. — **The Lotus Developer Conference.** Contact: Mark Scapicchio, Marketing Coordinator,Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, Mass. 02142.

WEEK OF MARCH 30

MARCH 31-APRIL 1, NEW YORK — **Software Tools Conference on Artificial Intelligence/Expert Systems.** Contact: Software Tools Conference, Conference Office, Suffolk University, Boston, Mass. 02108.

MARCH 31-APRIL 2, RICHMOND, VA. — **The Annual Parnassus Management Conference**. Contact: Parnassus, Inc., 100 Boylston St., Boston, Mass. 02116.

MARCH 31-APRIL 2, TORONTO — **Systems Project Management.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 31-APRIL 3, DALLAS — **Telecommunications Systems in Government.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903. Also being held April 14-17 in Atlanta.

APRIL 2, NASHUA, N.H. — **U.S. Invitational Computer Conference Series.** Contact: Suzanne Hubner, U.S. Conference Director, The Invitational Computer Conference, No. C-2, 3151 Airway Ave., Costa Mesa, Calif. 92626.

APRIL 2-3, DALLAS — **Fifteenth Annual ICP Million Dollar Awards and Executives' Conference.** Contact: Sue Stewart, International Computer Programs, Inc., P.O. Box 40946, 9000 Keystone Crossings, Indianapolis, Ind. 46240.

APRIL 2-3, SAN DIEGO — **Frost & Sullivan's Fourth Annual Computer Vertical Market Conference.** Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

WEEK OF APRIL 6

APRIL 6-9, NEW ORLEANS — **Electronic Funds Transfer Association Annual Convention and Exposition.** Contact: Convention Coodinator, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

APRIL 7-10, ORLANDO, FLA. — **International Operational Data Security Workshop.** Contact: International Association for Computer Systems Security, Inc., 6 Swarthmore Lane, Dix Hills, N.Y. 11746.

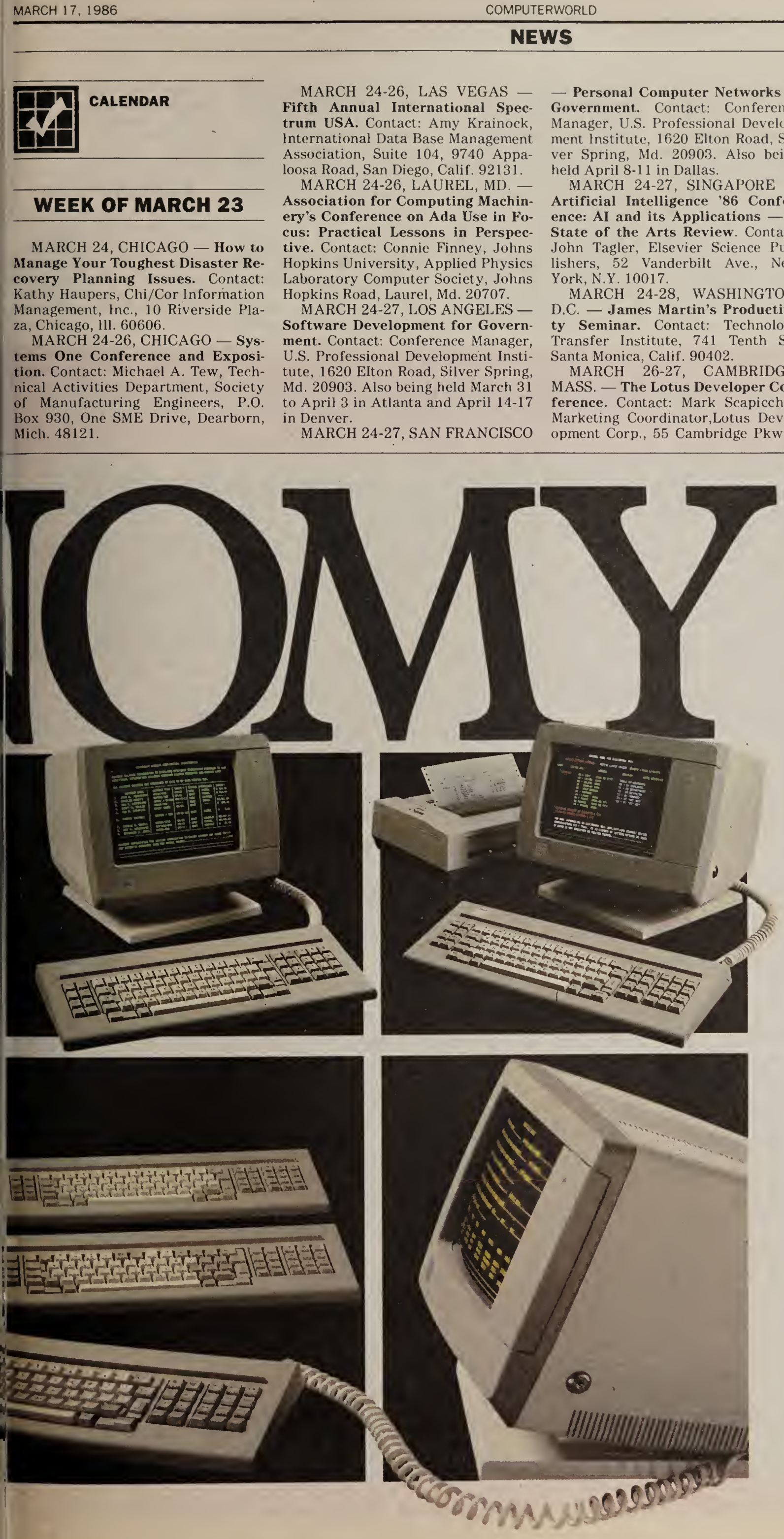
APRIL 7-10, SAN FRANCISCO — **1986 IEEE International Conference on Robotics and Automation.** Contact: Harry Hayman, Institute of Electrical and Electronics Engineers Council on Robotics and Automation, Exeter C3037, Boca Raton, Fla. 33434.

APRIL 7-10, WASHINGTON, D.C. — **Federal Office Systems Expo '86.** Contact: Renee Clark, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

APRIL 7-11, CHICAGO — **Successful Project Management: The Common Sense Approach.** Contact: Lois Zells & Associates, Inc., 11402 N. 53rd Place, Scottsdale, Ariz. 85254.

APRIL 7-11, ORLANDO, FLA. — **Tutorial Week Orlando '86.** Contact: Martez A. Camilleri, Director of Tutorials, Institute of Electrical and Electronics Engineering Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

See **CALENDAR** page 120



NEWS

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APRIL 8-13, TEL AVIV — **International Conference on Courseware Design and Evaluation.** Contact: Benjamin Feinstein, ICCDE Organizing Committee, Israel Association for Computers in Education, P.O. Box 13009, Hakirya, Romema, Jerusalem 91130 Israel.

APRIL 9-11, LOS ANGELES — **Corporate Electronic Publishing Systems: A Conference/Showcase III.** Contact: Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

APRIL 9-13, SINGAPORE — **Communicasia '86.** Contact: Gerald Kallman, Kallman Associates, Five Maple Court, Ridgewood, N.J. 07450.

WEEK OF APRIL 13

APRIL 13-17, LAS VEGAS — **The 1986 National Interact Conference.** Contact: Management Science America, Inc., 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

APRIL 14-16, MONTEREY, CALIF. — **Information System Support for Integrated Design and Manufacturing Processes Workshop.** Contact: Michael J. Zyda, Naval Postgraduate School, Department of Computer Science, Code 52, Monterey, Calif. 93943.

APRIL 14-17, PHOENIX — **Twenty-Fourth International Magnetics Conference.** Contact: J. U. Lemke, Conference Chairman, #1103, 2400 6th Ave., San Diego, Calif. 92101.

APRIL 15-16, CHICAGO — **Systems/34, 36 and 38 Users Show.** Contact: Andrew Wahtera, The Producers, 360 Merrimack St., Lawrence, Mass. 01843. Also being held May 28-29 in Washington, D.C.

APRIL 16-18, MADRID — **Personal Computers and Channels of Distribution in Europe Conference 1986.** Contact: Inteco Corp., Suite B-203, 800 Pollard Road, Los Gatos, Calif. 95030.

APRIL 17-18, HOUSTON — **Southwest Computer Measurement Group.** Contact: Ellen Robertson, Texas Utilities Services, Inc., 2001 Bryan Tower, Dallas, Texas 75201.

WEEK OF APRIL 20

APRIL 20-24, CHICAGO — **Robots 10 Conference and Exposition.** Contact: Robotics International of the Society of Manufacturing Engineers Public Relations, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

APRIL 20-25, NEW ORLEANS — **Twenty-Fourth Annual Conference of the Association for Educational Data Systems.** Contact: Association for Educational Data Systems — '86, P.O. Box 5689, Columbus, Ga. 31906.

APRIL 21, NEWTON, MASS. — **The Computer Industry in Massachusetts: Future Directions.** Contact: Deborah Dupee, Association for Women in Computing, Suite 21, 66 Chiswick Road, Brookline, Mass. 02146.

APRIL 21-24, WASHINGTON, D.C. — **Sixth International Conference on Decision Support Systems.** Contact: Julie Eldridge, Decision Support Systems — '86, 290 Westminster St., Providence, R.I. 02903.

APRIL 22-25, BOSTON — **Conceptual/Logical Modeling & Design: An Integrated Approach to Data & Process Methodology.** Contact: Bob Davoli, Charles River Development, 483 Beacon St., Boston, Mass. 02115.

APRIL 23-25, DALLAS — **Eighteenth International Management MIS Conference.** Contact: Bruce Brammer, Paper Industry Management Association, 2400 E. Oakton St., Arlington Heights, Ill. 60005.

APRIL 26, NEW YORK — **Fourth Annual APL as a Tool of Thought.** Contact: Devon McCormick, New York Special Interest Group on APL PDS, Suite 524, 660 Amsterdam Ave., New York, N.Y. 10025.

WEEK OF APRIL 27

APRIL 28-30, ALBUQUERQUE, N.M. — **Integrated Fiber-Optic Technology Training.** Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35525, Albuquerque, N.M. 87176. Also being held June 23-25 in Albuquerque.

APRIL 28-30, AVIGNON, FRANCE — **Sixth International Workshop on Expert Systems & Their Applications.** Contact: Jean-Claude Rault, Agence de l'Informatique, Tour Fiat — Cedex 16, 92084 Paris — La Defense, France.

ITT VOICE COMMUNICATION SYSTEM

The ITT Voice Communication System provides the ITT XTRA,™ ITT XTRA XP and Compatible Computers with advanced voice recognition, digitized voice record and playback, plus complete telephone management capabilities.

The ITT Voice Communication System is comprised of several companion products. The hardware consists of a single board which inserts into the ITT XTRA Personal Computer systems expansion bus. An optional microphone/speaker pod may be attached to the exterior of the Personal Computer or affixed to an optional desk stand. Also available as an option is the ITT VCS Headset for noisy environments. The ITT Voice Communication System includes the applications software necessary for speech recognition, speech digitization and storage, speech playback, word recognition training, and voice activated keyboard. The "ITT Voice Executive" is a software product which provides an appointment calendar, telephone directory, telephone answering, speed dialing, and message recording service.

ITT VOICE COMMUNICATION SYSTEM AND UTILITY SOFTWARE

The ITT Voice Communication System option card and its supporting software provides speech recognition, speech digitization, speech playback, and telephone management capabilities.

Pooled Speech Recognition:

The ITT Voice Communication System converts single words, received via the operator's microphone, into digital voice templates. The voice templates are generated in a training session which could involve multiple users, as in an office environment. This pooling of voice templates allows the system to respond to a word from any of several users and eliminates the need to reload templates for each user.

Voice Digitization:

The ITT Voice Communication System converts spoken words into a stream of digital signals which may be stored on a disk. To reduce the volume of data stored, a sophisticated data conversion scheme known as Residual Excited Linear Prediction (RELP) compresses the stream of digital signals before storage. This compression takes place without losing the information essential to reproducing the original speech. After compression, the data is stored at a rate of one kilobyte per second.

Voice Digitization Playback:

Previously digitized and stored voice data is reconstituted by reverse application of the RELP compression method. The end result is a playback of the previously recorded voice signal. Voice digitization and playback provide the advantage that once a voice message is digitized, it may be easily stored, retrieved or transmitted under program control.

Call Progress Tone Detection and Telephone Control:

In addition to speech, standard telephone signals for dial tone, busy signal, and ringback are recognized by the system and may be acted upon by other software.

Voice Activated Keyboard:

Included with the ITT Voice Communication System software is a program capable of accepting voice commands, recognizing them, and matching them with a pre-defined sequence of keystrokes. These keystrokes may be passed to an independent application program as if they had been typed on the keyboard. When this facility is in use, the conventional keyboard is still available for direct operation. The user may specify a vocabulary and associated keystrokes to be used for template training. Different vocabularies may be used with different application programs allowing greater flexibility in command usage. Conventional personal computer programs running under DOS may be conveniently controlled by voice commands.

Vocabulary Creation and Modification:

The ITT Voice Communication System utility software includes the necessary tools needed to train the system to recognize a user-defined set of words. The word set may be defined prior to training by using a line editor or word processor. Once defined, the words are integrated into voice files and the training may begin.

Independent Processing for Voice Operations:

The ITT Voice Communication System includes two dedicated processors and 128K of memory which operate independently of the system CPU of the Personal Computer allows concurrent operation of speech applications and standard applications software.

Highly Programmable to Aid Application Programmers:

Independent software developers find this system to be flexible and adaptable to their needs. It has been designed to have all characteristics accessible under program control.

The "ITT Voice Executive":

The "ITT Voice Executive" provides application programs to take advantage of the ITT Voice Communication System. These capabilities are intended to provide daily-use tools for the business person. Included are an appointment calendar with built-in reminder, telephone directory with auto-dial, and telephone answering and message taking.

The appointment calendar offers the capability to schedule, alter, and view appointments and reminders. In addition, a visual reminder will prompt scheduled appointments. The appointment calendar remains resident in main memory when other applications are operating and is quickly accessible to the user.

The telephone directory facility allows entering, retrieving, and modifying directory entries. Upon retrieval of a directory entry, the user may command the system to dial the retrieved number automatically. Users may also define their own, two-character speed dial code for each entry in the directory and use this code to dial the phone.

The telephone answering and message taking facility allows the ITT XTRA Personal Computer Systems to answer telephone calls with a digitized message, accept and store telephone messages, and review messages.

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NEWS

APRIL 28-MAY 2, RENO, NEV. — **Use, Inc. Spring Computer Conference.** Contact: Use, Box 461, Bladensburg, Md. 20710.

WEEK OF MAY 4

MAY 5-7, GENEVA — **Second World Congress of Production and Inventory Control.** Contact: World Congress Secretariat-2F, 500 W. Annandale Road, Falls Church, Va. 22046.

WEEK OF MAY 18

MAY 19-21, SAN FRANCISCO — **Hammer Forum West: Change and Continuity in End-User Computing.** Contact: Michael Hammer, Hammer and Co., Hammer Forum West, Five Cambridge Center, Cambridge, Mass. 02142.

MAY 20-23, ORLANDO, FLA. — **Techex '86 Americas: The Annual World Fair for Technology Exchange.** Contact: Anne E. Klenner, Dr. Dvorkovitz & Associates, P.O. Box 1748, Ormond Beach, Fla. 32075.

WEEK OF MAY 25

MAY 29-31, BLACKSBURG, VA. — **Personal Computer Interfacing for Scientific Instrument Automation.** Contact: Linda Leffel, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061.

WEEK OF JUNE 1

JUNE 2-5, DETROIT — **Vision '86 — Applied Machine Vision Conference and Exposition.** Contact: Vision '86 Public Relations, Machine Vision Association of the Society of Manufacturing Engineers, P.O. Box 930, Dearborn, Mich. 48121.

JUNE 2-5, NASSAU BAY, TEXAS — **International Symposium on Ada Programming Language Applications for Space Station Development.** Contact: University of Houston — Clear Lake, 2700 Bay Area Blvd., Houston, Texas 77058.

JUNE 4-6, SAN DIEGO — **1986 National Educational Computing Conference.** Contact: Susan M. Zgliczynski, National Educational Computing Conference '86, School of Education, University of San Diego, Alcala Park, San Diego, Calif. 92110.

WEEK OF JUNE 8

JUNE 7, BEIJING — **China-Didacta '86: The International Trade Fair for Educational Equipment.** Contact: Swiss Industries Fair, Secretariat China Didacta '86, P.O. Box CH-4021, Basel, Switzerland.

JUNE 10-13, ATLANTA — **Summer 1986 Unix Conference and Exhibition.** Contact: The Usenix Association Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

WEEK OF JUNE 15

JUNE 16-20, CAMBRIDGE, MASS. — **Managing Information Technology: New Responsibilities in a Changing Environment.** Contact: Center for Information Systems Research, Sloan School of Management, MIT, 77 Massachusetts Ave., Cambridge, Mass. 02139.

JUNE 17-19, ATLANTIC CITY — **Plas-Tech '86.** Contact: Delia Associates, P.O. Box 338, Delia Marketing Communications Center, Whitehouse, N.J. 08888.

WEEK OF JUNE 22

JUNE 22-27, PHILADELPHIA — **Management Information Systems for Strategic Advantage.** Contact: The Registrar, 200 Vance Hall, Office of Executive Education, The Wharton School of the University of Pennsylvania, Philadelphia, Pa. 19104.

JUNE 23-27, AMSTERDAM — **Fourth Annual European Fiber-Optic Communications and Local-Area Networks Exposition.** Contact: Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

JUNE 23-27, CHICAGO — **A/E/C Systems '86: The Computer and Management Show for the Design and Construction Industry.** Contact: Conference Director, A/E/C Systems '86, P.O. Box 11318, Newington, Conn. 06111.

JUNE 25-26, COATESVILLE, PA. — **Chester County Expo '86: CAD/CAM Conference from Micro to Mini.** Contact: Lee Smith, Central Chester County Vocational Technical School, 1635 E. Lincoln Highway, Coatesville, Pa. 19320.

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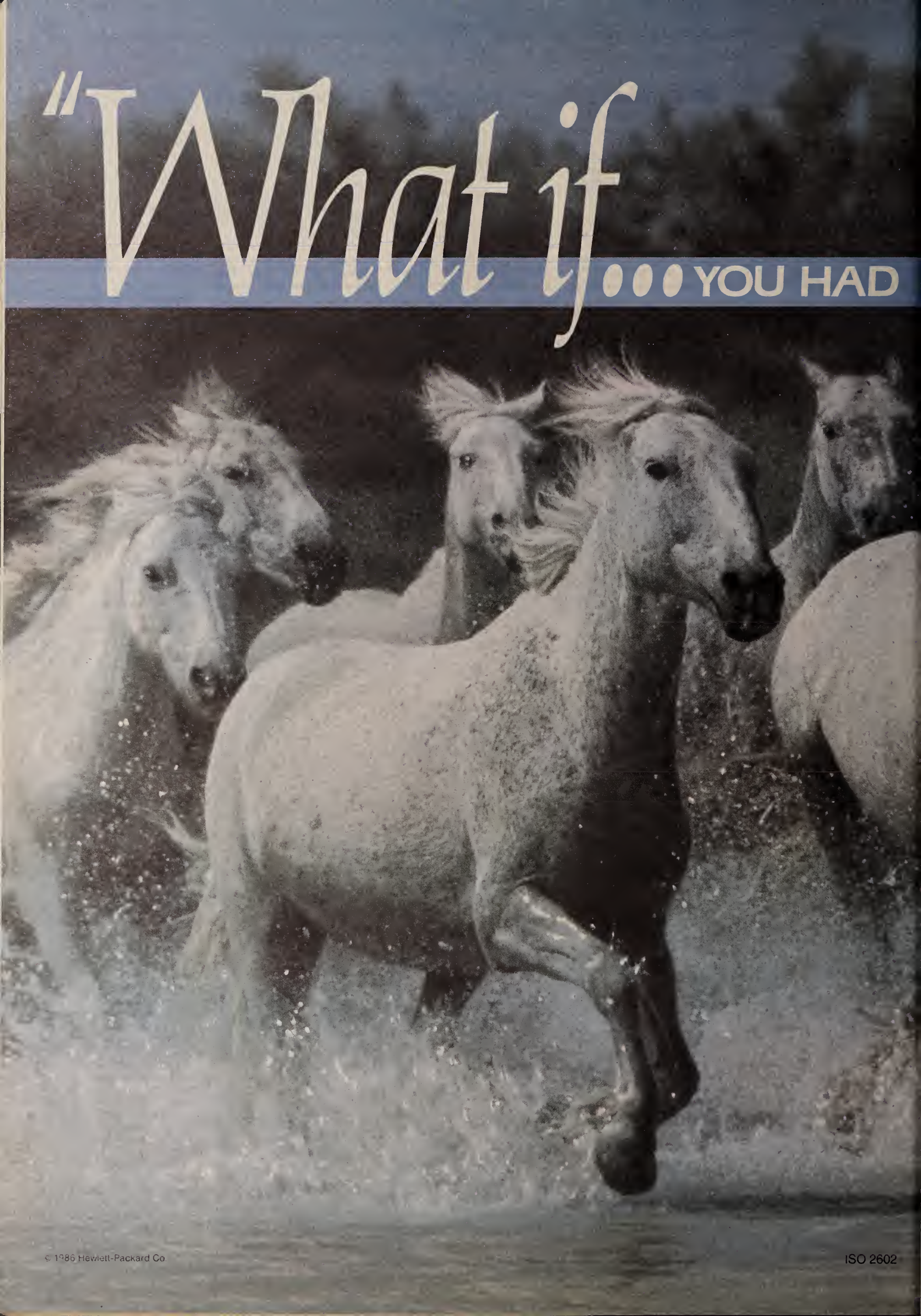

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COMPUTER INDUSTRY

Section begins on page 154

Memorex marks 25th birthday by streamlining operations

Plans to emphasize IBM PCM market

By Donna Raimondi

SANTA CLARA, Calif. — Marking its sometimes rocky transition from a magnetic tape company to a complete peripherals vendor, Memorex Corp. is celebrating its 25th birthday this year with a return to its core IBM plug-compatible business.

The company, named for "memory excellence" in 1961, has evolved from manufacturing tapes in the early 1960s to offering a variety of display stations, printers, tape and disk drives, disk and string controllers and solid-state storage devices. "Our goal is to supply everything but the mainframe," says President Philip Dauber.

After two years of rough financial sledding, Memorex became a wholly owned unit of Burroughs Corp. in 1981. A series of business sell-offs followed, as Memorex attempted to refocus itself.

In 1981, Memorex sold its audio tape business to Tandy Corp. The company sold its OEM small disk-drive division in 1984 and transferred its floppy disk and computer tape business to another Burroughs division.

Pared down and ready to do business, Memorex has concentrated on becoming a full-range IBM plug-compatible manufacturer (PCM).

"This is a very competitive business," Dauber says of the effort. "Prices are going down, and our challenge is to bring our costs down as fast as the prices are coming down."

The most serious problem Memorex faced occurred when its IBM 3380-compatible disk drive, the 3680, was released in 1984 with problems that caused head crashes on the disks. The problem was soon identified as faulty coatings on the disk platters and production was halted to allow correction, but Memorex had to put a cap on the product's sales until fixes were in place.

'A heart-wrenching problem'

"That was a heart-wrenching problem for them," says James Porter, president of Disk/Trend, Inc., a research firm that conducts an annual market study on the disk drive business. "Shipment rates were way off for about six months."

Memorex says it hopes to make its comeback in what could be a tough market. "We have seen the end of the technical problems with the 3680," Dauber says, "but it takes a while for the market to respond. We have certainly had difficulties with customers falling away."

What Memorex refers to as its Communications Division, which includes displays, printers and controllers, will make up about 30% of its 1986 revenues. Storage products will account for about 40%, and other products, such as media for the overseas market and rigid disks, will round out the revenue picture.

Memorex's employees back in the magnetic tape days

In the next few months, the Communications Division will introduce peripherals for the IBM System/34, 36 and 38. The Storage Division will release a cache device and double-density 3680 14-in. disk subsystem based on thin-film technology.

Memorex's bid to recover its economic health may be helped by the fact that some of the players in its market have dropped out or decreased production.

Control Data Corp., for instance, stopped production of its IBM 3380-compatible disk drive after it experienced the same disastrous crashes that disabled the Memorex version. Storage Technology Corp. is working hard to regain its foothold in the marketplace while operating under Chapter 11 of the U.S. Bankruptcy Code. Competition for the large Storage Division, aside from IBM, now comes from National Advanced Systems Corp. and Amdahl Corp.

See **MEMOREX** page 126

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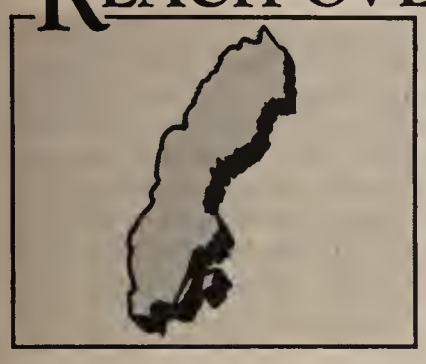

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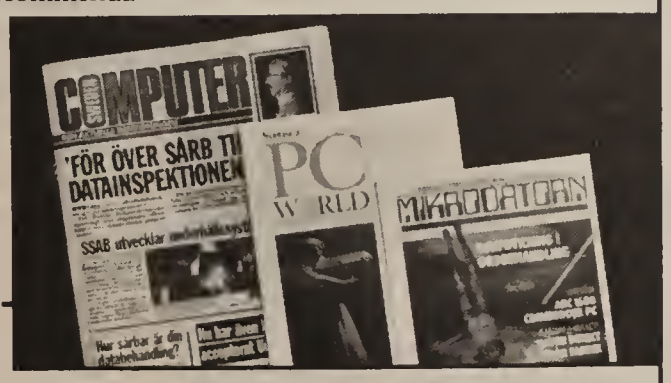

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MERGERS AND ACQUISITIONS

Xerox Corp. has announced the sale of the majority of the remaining assets — including the name — of its **Shugart Corp.** unit to the **Narlinger Group**, a Southern California investment partnership. Included in the sale is the 8-in. floppy disk drive the company makes and its disk-drive peripheral service and spare parts business.

■

Protocol Computers, Inc. has announced that it has reached an agreement in principle with **Telematics International, Inc.** a Florida corporation, with respect to Telematics' acquisition by merger of a 100% stock equity interest in Protocol.

Under the terms of the merger, each share of Protocol common stock other than shares owned by Richard L. Swarz, the founder and majority shareholder of Protocol, will be converted into the right to receive $1.40 in cash.

■

Automation Intelligence, Inc. has announced the sale of its **Vision Systems Division** to **Gould, Inc.**, Rolling Meadows, Ill. The terms of the sale were not disclosed.

■

Megatek Corp. announced the acquisition of the assets of Columbia, Md.-based **Perspective Technologies, Inc.**, a company that has developed a high-performance graphics system. Perspective Technologies' product uses off-the-shelf hardware and is a personal computer-based interactive real-time display processor.

■

Continental Computer Leasing Corp. has joined with **Hill Financial Savings Association** as a wholly owned subsidiary. Continental leases computers and peripheral equipment nationwide to a variety of industries.

■

Aegis Systems Corp., a marketing company based in San Jose, Calif., announced its acquisition of **Intelligent Technologies International Corp.** of Palo Alto, formerly a wholly owned subsidiary of **Logica, PLC**, Swindon, England. Intelligent Technologies supplies a wide range of coaxial and remotely connected micro-to-mainframe data communications products. Terms of the acquisition of the company were not disclosed.

GCA replaces its president

By Edward Warner
Computerworld News Service

ANDOVER, Mass. — Still reeling from the semiconductor industry recession, GCA Corp. earlier this month replaced its president with a trio of vice-presidents.

GCA, a maker of semiconductor manufacturing equipment, also said it is still seeking the $15 million in loans that it needs to remain viable but confirmed that it has held discussions with firms interested in acquiring it. So far, though, "no offers are on the table" from corporate suitors, said GCA spokesman Warren Davidson.

GCA responded to 1985 losses, estimated to exceed $110 million, by eliminating about 1,000 jobs, nearly one-third of its work force.

The company's problems culminated in the resignation of its President and Chief Executive Officer, Leonard

Computer Industry section begins on page 154.

S. Sheingold, who took office only three weeks before. No reasons were given for the departure of Sheingold, who remains on the company's board of directors. But, according to computer industry merger specialist Gilbert Mintz, the removal of a top corporate officer during a time of merger talks can be an indication that a company is preparing to go it alone.

"Usually the value of a company is enhanced by having the management team intact," according to Mintz, the founder of Broadview Associates, a Fort Lee, N.J., firm specializing in coordinating computer industry mergers. Mintz, though, said GCA's decision could also be seen as reflecting a lack of confidence in Sheingold.

Memorex marks 25th birthday

From page 125

Being ready with the next generation of products will not be easy for Memorex. In disk storage, for instance, the thin-film head technology used to read dual-density disks is at the limit of what the thin-film process can now do. The next advance in disk technology, a quad-density system, will require major development breakthroughs before it can be accomplished.

Memorex could be hurt by not having its double-density version of IBM's 3380 disk system available yet, Disk/Trend's Porter says. Vast numbers of people are opting to buy from IBM now rather than wait for the PCMs' lower prices.

Dauber feels that Memorex is in a good position for growth, however. With the technical difficulties of the 3680 behind it, the support of financially solvent parent Burroughs and new products like an IBM 3480 cartridge tape device due, the company is poised to start its second 25 years.

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Dianne Kearns
Director of Marketing
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Pathway Designs cuts staff in response to lower growth rate

Micro-to-mainframe link vendor shifts focus

By Stanley Gibson

NATICK, Mass. — Responding to performance that fell short of projections, Pathway Designs, Inc., a maker of IBM micro-to-mainframe link hardware and software, recently laid off 10 of its 58 employees, including two top executives.

The layoffs included Pathway's director of marketing, Grace Zimmerman, and its director of engineering, Sumner Blount, according to Pathway President Robert Broggi.

"We had geared up our resources for a more rapid market," Broggi said. "We've all taken a little bit of a hit from the downturn in the PC business."

Pathway had sales of $5.1 million in the year ending June 1985. Broggi said the company would exceed last year's sales but would fall short of its $10 million goal in fiscal 1986.

> ***'We had geared up our resources for a more rapid market. We've all taken a little bit of a hit from the downturn in the PC business.'***
>
> — Robert Broggi
> Pathway Designs, Inc.

Pathway sells an add-in board for the IBM Personal Computer with IBM Systems Network Architecture-compatible software in competition with IBM and with a handful of small companies with similar products. Broggi cited competition from the small companies, rather than IBM, as the most serious in its market and a cause of its disappointing performance. "A rash of people came into the ballgame," Broggi said.

The company had been concentrating on end-user sales, but slowness in orders from end users prompted the company recently to concentrate more heavily on sales to OEMs and value-added resellers. The company has about 20,000 units installed, according to Broggi.

Broggi acknowledged there had been problems in developing a new product directed toward the computer-aided design and manufacturing market but asserted that the reliability of installed products has been high.

Since its founding in 1982, Pathway has received $2.9 million in venture capital from several sources. Recently, the company closed $1.75 million in financing from a group of investors, including Investors in Industry Corp. and UST Capital Corp. The investor with the largest stake in the company is Venture Capital Fund of New England.

■

Separately, microcomputer printer vendor Datasouth Computer Corp. of Charlotte, N.C., recently laid off 18 direct production workers and four staff persons, reducing its permanent work force to 179 people. Datasouth cited low order rates, resulting from soft market conditions, and a delay in the scheduled shipment of new products.

"Production delays are an inherent risk in bringing new products to market; however, such products represent the future of the company, and we will continue to focus on our product development efforts," Datasouth President Jim Busby said. Datasouth has laid off workers due to the same factors before, Busby said.

Home market lures once again

From page 154

tendees. The disk (manufactured for, not by, Microsoft) demonstrated CD-ROM capabilities in what Microsoft called a multimedia encyclopedia.

Some followers of optical-storage technology said they believe Microsoft has the ability to pull off an entrance into the CD-ROM market successfully. "The multimedia encyclopedia is only the tip of the iceberg," said Edward Rothchild, publisher of *Optical Memory News* in San Francisco.

But one can't help but wonder whether Microsoft is getting in over its head by pursuing a fickle consumer market that may not be ready to change the way it receives information. The company's corporate enthusiasm for the home market is eerily reminiscent of the bold predictions in the early 1980s for personal computers by the Silicon Valley and Massachusetts' Route 128 technology region. As Atari Corp., Coleco Industries, Inc. and even Apple Computer, Inc. found out the hard way, the microcomputer did not become as indispensable as a TV set.

Microsoft's marketing acumen and business sense as a player in the world of corporate computer use is a major reason why its current public offering is one of the most eagerly awaited in years. But if it makes a serious push into the CD-ROM consumer market, it may soon learn that the lessons of MS-DOS and Windows in the business market do not apply.

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Micro clearance sale slated

By Peggy Watt

HAYWARD, Calif. — Computerland Corp. will attempt to dispose of about $25 million in new but excess inventory, priced as much as 80% off retail value, with a massive clearance sale of micro equipment. The sale is scheduled for 10 days next month in a Los Angeles warehouse.

IBM, Compaq Computer Corp. and the new line of Apple Computer, Inc. equipment will not be included because those manufacturers' products have resale restrictions, according to Computerland.

But the estimated 8,000 different kinds of hardware, software and peripherals will include demonstration equipment, obsolete and merely unsold items contributed by Computerland stores throughout the country.

Microcomputer Inventory Exchange of Santa Barbara, Calif., will handle the sale, which will run from 8 a.m. to 8 p.m. daily on April 5-14 at a 120,000 sq-ft warehouse in Santa Ana, Calif.

Microcomputer Industry Exchange is an organization that sells excess inventory for manufacturers.

Corporate buyers and professional brokers can get a preview in a catalog available before the sale and make take bids before the opening or base bids to buy what is left afterward, according to Fred Brown, president of Microcomputer Industry Exchange.

Bulls and bears face off over IBM

From page 154

mainframe computers, a key source of its revenue. Strong demand for departmental minicomputers from companies such as DEC and Prime Computer, Inc. have done even more to weaken mainframe demand, analysts say.

According to William F. Zachmann, vice-president of corporate research for International Data Corp. (IDC), IBM will be unable to maintain its quasi-monopoly position in large systems, even against the Japanese, and is almost certain to lose market share in both the high and low ends of the market.

The "openness" of the IBM PC also has made it inexpensive and easy to copy, heating up competition and pushing prices down dramatically.

Last month IBM reduced the price it charges high-volume dealers for the IBM Personal Computer dual-floppy-drive model 20% from $1,375 to $1,100, according to Michele Preston, a computer analyst with L. F. Rothschild, Unterberg Towbin. The price to dealers on the single-floppy PC was reduced 13%, and analysts say they expect further cuts across IBM's Personal Computer line later this year.

But other analysts see IBM in a better light. Frederic H. Cohen and Walter J. Winnitzki, both analysts with L. F. Rothschild, say they believe IBM stock is undervalued and recommend purchase. Rothschild estimates that IBM earnings per share for 1986 will be $12.50.

Jay Stevens, an analyst with Dean Witter Reynolds, Inc., agrees. "We think they can pick up," says Stevens, who estimates that IBM will earn $12 per share for 1986.

Meanwhile, critics such as IDC's Zachmann continue to urge caution. "If the economy catches so much as a whisper of a cold this year, 10 bucks a share could be a long, long, long reach for IBM this year," Zachmann says.

"IBM will be doing very well this year to be essentially flat," says Marty Gruhn, an analyst with The Sierra Group of Tempe, Ariz.

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IBM itself admits to some problems and recently issued a statement in response to the lowered earnings projections of some analysts.

"For some months IBM has been indicating caution about 1986. There has been an absence of evidence of improvement in the U.S. economy, particularly with respect to capital equipment buying patterns as we perceive them," the statement said.

The firm, however, remains upbeat and says it believes that new products and price cuts will have a positive impact after the first quarter.

Even the bulls admit that IBM is feeling the heat in all segments of the market but argue that the firm is taking steps to maintain many of its competitive advantages.

To fight competition from clone manufacturers in the personal computer market, for example, IBM is taking extra steps to make its dealers happy. New programs such as inventory financing through ITT Commercial Credit, a restocking program that allows dealers to return unsold inventory, a cap on the number of authorized dealers and a gray market public relations campaign are all indications that IBM wants its dealers to push its products more, analysts say.

And new products, along with price cuts, may also boost sales. "The shortcomings in IBM's middle range are being addressed, albeit slowly," say Cohen and Winnitzi, who expect no solution to this problem for at least a year. The Sierra Group's Gruhn says he believes that a new mid-range 370 or 4300 will eventually replace the System/36 line and improve IBM's footing in the mid-range market.

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UK software vendor hurdles obstacles to enter U.S. market

Culture, time zones stymie British invasion

By Edward Warner
Computerworld News Service

International Data Corp. (IDC) analyst Jack Hart has a map of the U.S., with an overlay of the UK, that he uses to show British software publishers how difficult it will be to sell their wares in the U.S. When Hart lays the British map over that of the U.S., the UK appears to be swallowed up under just three states — Utah, Idaho and Colorado.

A British software product's success in the U.S. usually depends on how well its marketers deal with America's regional differences and its multiplicity of time zones, according to Hart. The difference in time zones between areas of the U.S. and the UK are so great, in fact, that there is no time during British business hours that a caller can reach someone during business hours in Los Angeles.

Despite the hurdles, at least one British software company, Micro Focus Ltd., claims to be thriving in the U.S. Micro Focus, which markets Cobol programming tools and compilers, now generates from 50% to 60% of its annual revenue from U.S. sales — just six years after it opened its U.S. subsidiary, its first subsidiary outside the UK. In 1984, the company reported U.S. earnings of $13 million on total revenue of about $24.6 million.

The U.S. software market provided Micro Focus with a springboard to become one of the world's top 10 microcomputer software firms in revenue, says the company's marketing consultant, Peter Hewitt. Micro Focus has since opened a Japanese subsidiary, and, as a mark of its stature in the international scene, it recently signed $4.4 million in licensing agreements with three Japanese vendors.

The licenses will permit the Japanese firms — Ricoh Co., Nippon Telegraph & Telephone Corp. and Hitachi Ltd. — to run the Micro Focus version of Cobol on their Unix-based personal computers. Ricoh's agreement also enables it to bundle Micro Focus Level II Cobol/ET as well as the Micro Focus programming tools Animator and Forms-2 with the Ricoh Ricom computers.

With a success story like Micro Focus' to inspire them, a number of other British software companies have targeted the U.S. as their first point of entry into international marketing. For many of those firms, there is no choice other than the U.S. if they want to continue to grow.

According to Hart, IDC's vice-president of international services, the UK market is relatively small, and many British software houses achieve their maximum level of domestic market penetration relatively quickly. Hungry for greater sales, they turn to the U.S., where it at first appears that their software, and their business practices, need only a limited translation.

This assumption gets a lot of British software publishers into trouble, Hewitt claims. "Often it's a question of the meaning of an exchange between a speaker of American English and British English," he says. "A Londoner, for example, will likely say 'right' when he means 'tell me more,' while an American can take that to mean he's won an agreement."

> ***'A Londoner . . . will likely say "right" when he means "tell me more," while an American can take that to mean he's won an agreement.'***
>
> — Peter Hewitt
> Micro Focus Ltd.

The eight-hour time difference between London and the U.S. West Coast, Hewitt adds, is "an absolute nightmare." But the California location made sense for Micro Focus because the firm had to go where the major customers were, which in the U.S. microcomputer industry means Silicon Valley.

Hewitt attributes much of the firm's success in the U.S. to this kind of market commitment and its willingness to respond to local needs. It has since opened offices in Washington, D.C., and Chicago and currently employs 100 people in the U.S.

Overall, however, few European software firms have established successful beachheads in the U.S.

Nonetheless, European software publishers are still attracted to the lucrative U.S. market. Representatives from about 60 British software publishers turned up at a UK conference last year on how to break into the U.S. software market.

Hart, who spoke at the conference, showed the software executives his map of the U.S. swallowing the UK and gave the managers his best advice: Pay attention to distribution, and hire an American manager. He also warned them that "just because you've got a good software product that sells well in the UK may not mean it will sell well in the U.S."

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IBM weighs laptop need

Entry Systems chief cites corporate micro strategy

By Eric Bender

BOSTON — IBM Entry Systems Division President William Lowe hinted at plans for a laptop computer and restated IBM's commitment to open architecture and to Microsoft Corp.'s MS-DOS operating system during a rare public appearance

Sperry axes 1100 micro

By James A. Martin

BLUE BELL, Pa. — Sperry Corp said last week it has abandoned efforts to bring its 1100 series mainframe architecture down to the desktop level and will concentrate marketing efforts instead on its Series 5000 AT&T Unix based supermicrocomputers

The company also confirmed that it has laid off a total of 225 employees, mostly in the product development and production departments, but said the two moves were

Amdahl out with Sierra competitors

By Jeffry Beeler

SUNNYVALE, Calif. — Amdahl Corp. last week countered IBM's February high end systems announcement with the introduction of three 5890 series mainframes. Amdahl said the systems offer increased internal logic over existing systems with either price or performance benefits over the IBM 3090 family counterparts

Special Report Display terminals: A buyer's market/**71**

In Depth Information centers in corporate America/**88**

In Depth Training for productivity/**83**

Chip death Mostek closes its doors/**135**

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IBM users confused by net reversal

By John Dix

IBM's policy reversal in conceding that twisted-pair telephone wiring is adequate for data transmission has surprised and confused a sampling of users interviewed by *Computerworld*. Those users have installed or are planning to install IBM's Cabling System with more expensive shielded wire

The mainframe maker has told users, since the introduction of the building wiring scheme in May 1984, that it was necessary to use a shielded-type wire to support data devices and future IBM local-network products.

"IBM kept telling us we had to go with shielded wire if we were going to use the IBM local network," said Greg Burns, senior communications administrator with Bergen Brunswig, a Carson, Calif.-based medical and surgical supply distributor

That is no longer true. IBM announced a new type of nonshielded cable for the Cabling System three weeks ago with the introduction of its Token-Ring network. This standard twisted pair wire can be used for the new local network or for the support of data devices

The Cabling System is a building wiring scheme that specifies how and with what a building can be cabled to provide outlets like electrical sockets for data devices. Use of the system obviates the need to pull new wires every time peripherals are moved

Continued on page 10

'Get tough,' DPers urged

By James Connolly

HOUSTON — The president of a major mainframe software company has taken his campaign for applications standards to the general user community

Ask the tough questions," urged Software International Corp. President Jeffrey S. Goodman, encouraging DP managers to be demanding in dealing with companies such as his own. The chasm has never been wider" between what users need and what vendors provide, Goodman told members of the Data Processing Management Association last week

In recent months, Goodman has prodded vendors to adopt such standards. Last week's appearance, at the annual DPMA

Continued on page 12

TOP OF THE NEWS

Ask Computer Systems, Inc. this week will introduce versions of its Manman manufacturing information software for Digital Equipment's Microvax II. The software was previously available only on Hewlett-Packard's HP 3000 series. A Manman/Microvax II turnkey system with four terminals will be priced at $149,000

Convergent Technologies suffered a mass exodus of top management last week as founder and Chairman Allen M. Michels resigned to form a new company, taking four top officers with him. Although Michels told Convergent that the new venture will not be a direct competitor, the episode raises the po-

Continued on page 15

Apple push on for more system links

Improved Mac, IBM, DEC compatibility is targeted

By James A. Martin

IRVING, Texas — Apple Computer Inc. will focus on networking solutions to address compatibility problems between its Macintosh and IBM mainframes and Digital Equipment Corp.'s VAX systems, according to company President John Sculley

Speaking to a gathering of computer dealers sponsored by the Businessland computer retail chain, Sculley briefly outlined several Apple networking projects that included systems to incorporate IBM Systems Network Architecture networking capabilities and support for LU6.2, Document Interchange Architecture and Document Content Architecture. These systems will not penalize the user with slower response time or other limitations" and will provide not only terminal emulation or [personal computer like] functions but also access to complete office systems and distributed data processing functionality," Sculley said

These efforts are aimed at giving the Macintosh a more competitive position in an office automation marketplace where IBM is the standard, Sculley said the Macintosh has "not yet been broadly accepted by business" because most end users initially preferred the computing power available from Microsoft Corp. MS-DOS processors over the Macintosh's ease-of-

Continued on page 8

CW EXCLUSIVE

On the job: Hartford's blueprint for a DP hire

By Paul Korzeniowski

HARTFORD, Conn. — When Frank Shaw looks at his to-do list this morning it will be radically different from last Friday's. Locating the nearest coffee machine and unpacking his belongings will top this week's list as Shaw begins his first day as director of data processing for the city of Hartford

Shaw comes to his new office, housed in a brick building on a quiet street on the outskirts of downtown Hartford, after serving as DP manager at Rhode Island Hospital in Providence, R.I.

The hunt for Shaw, which took only two months, could serve as a model for efficiency for other municipalities or corporations

The search started on a sour note. Last winter, when the city decided to replace its Burroughs Corp. B830 mainframes (see story page 6), it did not anticipate replacing its director of data processing as well. But that is what happened. In May, the former director decided to retire rather than oversee a conversion to another system. She had talked about retirement, but we had expected her to remain here for at least one more year," noted Lee Erdmann, an assistant city manager who oversaw the hiring of Shaw

A temporary director was appointed because the city did not want to hire a director of data processing before awarding a new hardware contract. In June the city signed a contract with IBM for a 4381 Model I, and in July a search for someone to manage the conversion and the 85-person DP staff began

Hartford's Shaw

The hunt stretched far and wide as advertisements were placed in *The Boston Globe*, *Computerworld*, *The Wall Street Journal* and a number of local newspapers. Approximately 160 HP professionals answered Hartford's call for someone to oversee the operation at a salary between $70,000 and $90,000.

Erdmann, Mike Brown, another assistant city manager — and Chester Smith, the executive director for the Citizens Committee for More Efficient Government, sifted through the applications in search of the right candidate. That person would have managed at least a few major projects, be very familiar with IBM's offerings, especially the 4300 line, and would have

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COMPUTER INDUSTRY

AT&T succeeds in helping laid off employees find jobs

Other firms hungry for communications skills

By Charles Babcock

MORRISTOWN, N.J. — When AT&T Information Systems announced it was cutting staff by 24,000 in the summer of 1985, a wave of apprehension went through its work force, former AT&T workers say.

With an industry slump under way, many wondered where they would find new jobs. Since the terminations began, however, AT&T has found a number of ways to lessen the impact, say workers who succeeded in finding new jobs.

For the first time in a large-scale layoff, industry sources say, AT&T ran newspaper advertisments under its logo citing the skills of the people it was forced to terminate. The ads told employers in 25 cities that this was their chance "to connect to some of the smartest, the most highly trained, most capable people in America."

AT&T provided its former employees with severance benefits, job hunting counseling and a data bank of job openings. The assistance could not guarantee a smooth transition in every case, however.

"I had a very difficult time finding a job," says Carol A. Bray, a former AT&T Information Systems employee now at work with AT&T Communications in Somerset, N.J. "I sent my form to be loaded into the computer at the placement center, and a month later when I called, it wasn't there." Bray, a divorced mother of three, recalls "getting desperate" during the seven weeks of uncertainty that accompanied her transition.

Assistance efforts mostly successful

But for the most part, the efforts were successful, according to laid off employees. By the end of December 1985, 41,000 jobs were listed in the data bank, 10,000 in the New York-New Jersey area alone, AT&T spokesmen say.

Employers in few parts of the country failed to respond. The data bank listed 4,000 openings in California, 1,500 in Texas and 1,400 in Florida. It showed 119 in Oregon, 111 in Maine, 102 in Idaho and six in Hawaii.

In greatest demand were skills in marketing and sales, systems design and technical services, followed by engineering and programming. Although these skills are transferable to many areas, it was assumed by most employers that the people departing AT&T possessed skills in communications, and that was what those employers wanted.

"It's moderately hard to find people in communications," says Roger D. Everson, executive director of the State of Tennesee's new Division of Communications Management. A former AT&T staff member himself, Everson hired four former AT&T workers to bring his staff up to 21.

When Debbie L. Walker, an AT&T programmer/analyst, realized a big cutback was coming, she decided to search for work in her hometown of Wilmington, Del. Checking the AT&T data bank, she found two listings there and ended up interviewing for a programmer/analyst job before she could go through the AT&T-arranged counseling. She left AT&T without using the placement services and was at work with a Wilmington consulting firm 10 days later.

Patrick S. Reed-Reimer, an AT&T sales repesentative, had a sense of deja vu when AT&T Information Systems in Orlando, Fla., announced it was going to cut staff. He had earlier been declared surplus at Braniff Airways, Inc. when the airline industry was deregulated, and he had little seniority to protect him during the deregulation of the telephone industry.

After leaving Braniff he had spent eight months waiting on tables and working at a camera shop. So when openings started appearing in the AT&T data bank, he contacted firms in Orlando and went to work for Tech Aid, a contract job placement agency, a week after he left AT&T.

Paul J. Harned, a former private branch exchange installer and maintainer at AT&T in Orlando, left for a similar post with Vista United Communications, the telephone company that serves Walt Disney World.

Marketable communications skills

Although these former AT&T workers say they do not think their cases are atypical, they agree that having technical skills in communications made them more marketable. Two acknowledge they took pay or benefits cuts, a blow they think will fall with greater severity on the non-technical employees.

Six thousand of the previously announced layoffs are scheduled to take place this year, and many AT&T workers remain anxious over whether there will be anything left in the job market if the ax reaches them. "I'm just waiting to be declared surplus. I feel very uneasy," says an Information Systems manager in Morristown.

Still, she will not begin looking outside AT&T until she receives notice that her job has been eliminated, she says. Once she does, she may find the non-AT&T world a less hostile place than imagined.

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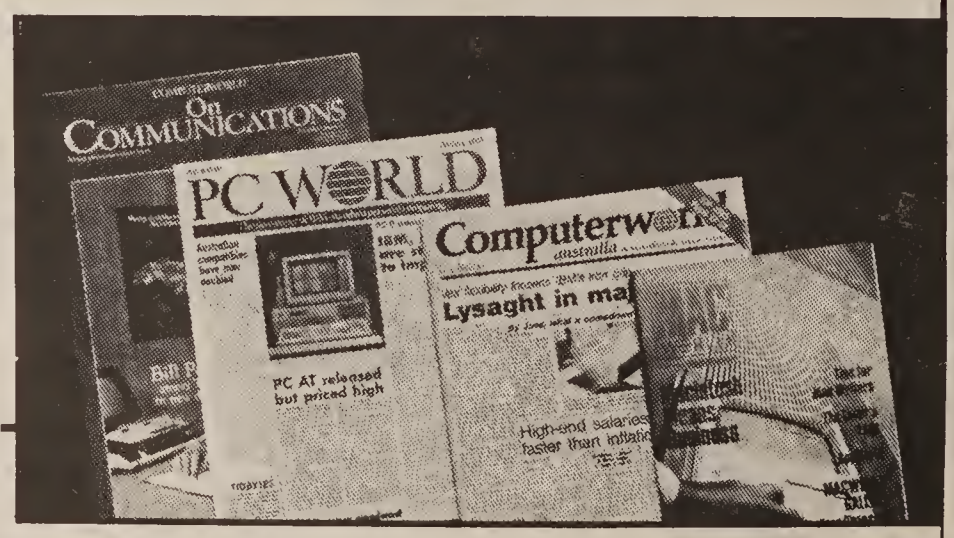

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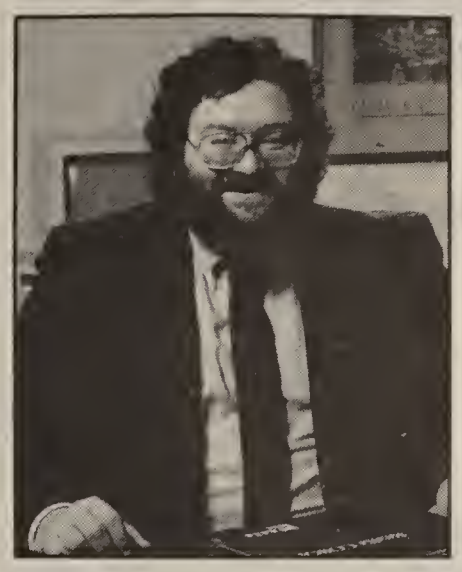

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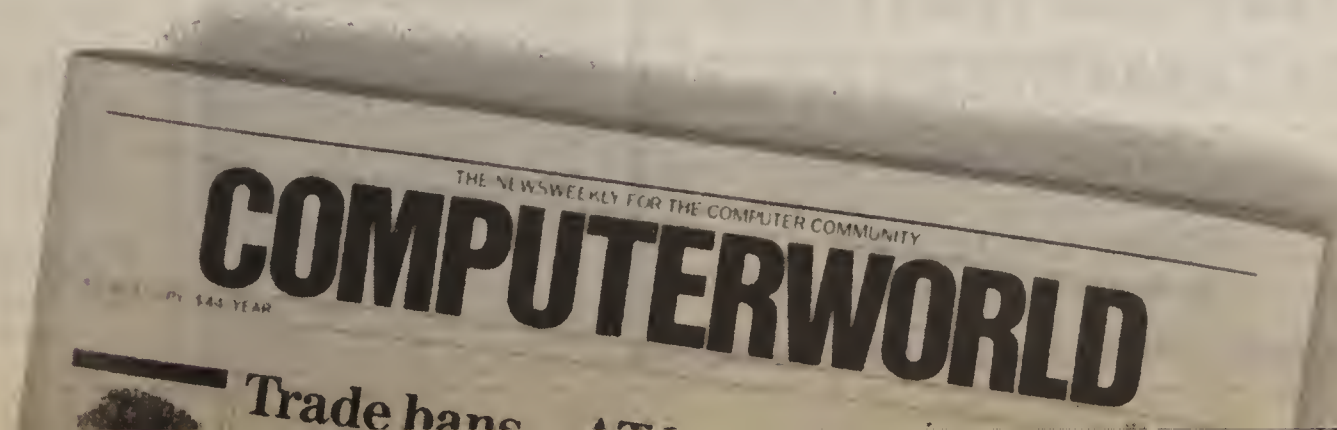

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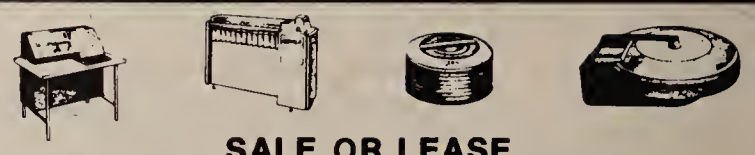

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4331-1	0.25	0.5 to 1	3033N	4.3	4 to 16
4331-11	0.38	1 to 2	3038EX	4.4	8 to 32
4331-2	0.50	1 to 4	4381-3	4.5	8 to 32
4341-9	0.52	1 to 4	3033UP	5.0	4 to 24
4361-3	0.70	2 to 4	•4381-14	6.0	16 to 32
4341-10	0.75	2 to 4	3083B	6.3	8 to 32
4341-1	0.88	2 to 4	3083BX	6.6	8 to 32
4341-11	1.1	2 to 8	3083J	8.4	8 to 32
4361-4	1.15	2 to 12	3033MP	8.5	8 to 32
3031	1.2	2 to 8	3033AP	8.5	4 to 24
4361-5	1.45	2 to 12	3033JX	8.8	8 to 32
•4381-11	1.4	4 to 16	3081D	10.0	16 to 32
4341-2	1.5	2 to 16	•3090-150	10.1	32 to 64
4241-12	1.65	2 to 16	3081G	11.0	16 to 48
3031-AP	2.0	2 to 8	3081GX	11.9	16 to 64
4381-1	2.1	4 to 16	3081K	14.0	16 to 48
3032	2.5	2 to 8	•3090-180	15.4	32 to 320
4381-2	2.7	4 to 32	3081KX	15.5	16 to 64
•4381-12	2.7	8 to 32	3084G	26.6	32 to 96
3033S	2.9	4 to 16	3084QX	28.7	32 to 128
3083CX	3.3	8 to 32	3090-200	29.4	64 to 320
•4381-13	3.6	8 to 32	•3090-400	52.9	128 to 640
3083E	4.2	8 to 32			

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SYSTEMS	MIPS	MEGABYTES
470V/7A	4.5	8 to 32
470V/7	5.5	8 to 32
470V/8	6.5	8 to 32
5840	8.4	16 to 64
5850	11.6	16 to 64
5860	14.0	16 to 64
5867	22.0	24 to 64
5868	28.0	32 to 128
5870	26.6	16 to 64
5880	26.6	32 to 128

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AS 8043	5.2	8 to 32
AS 8053	6.5	8 to 32
AS 8063	8.4	16 to 32
AS 9040	7.2	8 to 48
AS 9050	9	8 to 48
AS 9060	11.2	16 to 64
AS 9070	16.2	16 to 64
AS 9080	20	16 to 64
†AS XL-60	28	32 to 256
†AS XL-80	50	64 to 256

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The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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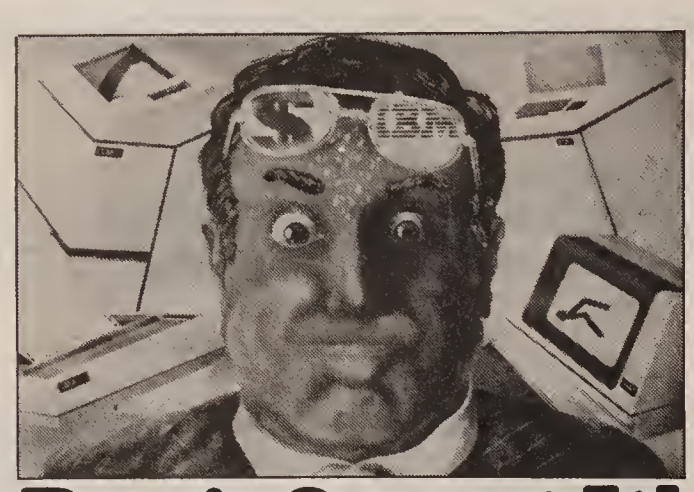

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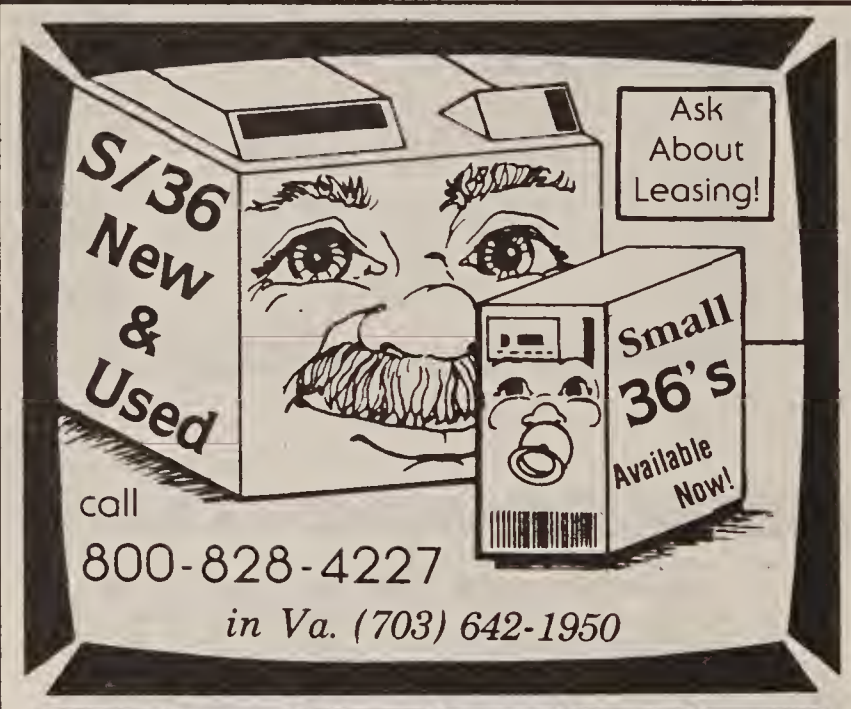

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COMPUTER SCIENTIST - Responsible for implementation and coordination of research and development projects in knowledge acquisition and natural language processing. Conducts independent research and coordinates a development team composed of company personnel, clients and third party software developers. Designs and develops software to support the process of acquiring and representing very large knowledge bases directly from subject matter experts. Uses protocol analysis, cognitive modeling, field interview techniques, and experimental methods, as well as Artificial Intelligence techniques for knowledge acquisition and expert system implementation. Builds natural language interfaces for relational databases, expert systems, and general purpose calculation and display management systems. Some travel within the United States is required. Must have Masters Degree in Cognitive Psychology and two years experience or training performing Artificial Intelligence and Cognitive Science empirical research, using interview techniques, experimental methods and protocol analysis. Minimum requirements are: Working knowledge of Lisp language implementation of natural language systems and expert systems; working knowledge of natural language processing techniques and KL-TWO knowledge representation system; ability to develop new algorithms for natural language processing. Salary $38,500/year, 40 hours/week. Respond with resume only to Job Order #6440, Massachusetts Division of Employment Security, Boston, MA 02114

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Software Engineers Multiple openings for BSEE's with a minimum of two years experience as Software Engineers. Openings in signal processing, microwave, radar, satellite communications, electro-optics, power supply, inertial navigation and image processing. Experience with VAX 11/7XX, PDP 11/XX, FORTRAN, ADA, PASCAL and/or ASSEMBLER sought. Phoenix. To **$52,000.**

Software Engineers/Managers — Will Cross-Train High-tech electronic systems manufacturer is expanding staff for new development in UNIX/C on 808X, M68XXX microprocessors. Real-time operating systems, compilers, hardware control, software tools and application specialists are needed. Can train solid PASCAL/ASSEMBLER experienced on UNIX and C. Prefer BSEE or Technical BSCS degree. Excellent company benefits and relocation. Starting salaries: **$31,000 to $65,000.**

MVS/XA Systems Programmer Multiple 3084 data center in Phoenix seeks Senior MVS/XA Systems Programmer. State-of-the-art IBM data center with communications to other data centers worldwide. Experience in project management for large systems integration preferred. To **$48,000.**

Programmer/Analyst Fast-growing, stable company in new Scottsdale, Arizona facility. Design and program using CICS + COBOL. Minimum of two years IBM sought. IMS Database experience preferred. To **$34,000.**

Programmer/Analysts — IMS/Training Fortune 100 client has major new development projects. State-of-the-art OS/MVS shop with professional environment, structured methodology. Programmer/Analysts with two years or more experience using IMS DB/DC with COBOL sought. Also have development with PL/1 and CICS for new on-line transaction system. Excellent training programs, benefits and career progression. Starting salaries: **$25,000 to $39,000.**

Programmer/Analysts — 20 minutes from the Slopes Major services firm needs Programmer/Analysts to support new system upgrades in 1986. OS/MVS, CICS COBOL environment. Opportunity to enjoy the outdoors and live in a low cost-of-living area at the base of the Rockies. Starting salaries: **$25,000-$29,000.**

Programmer/Analysts — Systems 34, 36, or 38 Exciting opportunities in new development of financial and reporting systems for nine year old Phoenix firm. Professional staff has tripled in the last two years. Multiple CPU's installed migrating from System 34 to System 36 with planned addition of System 38 or 4300 as demand increases. Prefer some communications experience with Remote Systems. Starting salaries: **$20,000 to $29,000.**

Senior Programmer/Analyst — Banking Lead installation of new commercial loans package for state-of-the-art bank. Beautiful suburban Phoenix location. Prefer commercial loans experience and/or strong IMS with COBOL. Banking and ALC preferred but not required. Excellent path to Project Management. To **$34,000.**

Colorado

Programmer/Analyst—ADABAS Growing organization with multiple new development projects is seeking a Senior Programmer/Analyst. Strong exposure to ADABAS/NATURAL desired. Excellent opportunity to use structured methodology in a well-managed professional organization. To **$36,000.**

MSA Senior Programmer Stable, growing Colorado-based company has an opening for an experienced Programmer/Analyst ready to move into a leadership role. Support payroll and accounting software in an OS/MVS environment with an opportunity to learn CICS. Experience with MSA or McCormack and Dodge is highly desirable. To **$35,000.**

Defense Systems — New Development Participate in state-of-the-art programs. Opportunities exist in C³I, Telecommunications, ADABAS/NATURAL, MOD 204, and Artificial Intelligence development. Multiple long term projects. Security clearances (EBI) highly desirable. To **$53,000.**

Systems Programmers — New IBM Data Center Ground floor opportunities available in Systems Programming and Operations in state-of-the-art, OS/MVS, VTAM, CICS environment. Telecommunications experience preferred. To **$45,000.**

Programmer/Analysts/Managers — Health Care Newly-formed division of a Denver-based health care service firm has multiple opportunities in the development of new systems and installation of a major Hospital Information System. Programmer/Analysts with CICS experience preferred. Project Managers must have health care installation experience. To **$45,000.**

Software Engineer — Artificial Intelligence Advance your career in a leading edge environment at the base of the Rocky Mountains. Defense and non-defense AI projects. One year experience in AI with LISP or PROLOGUE preferred. To **$60,000.**

OS/MVS Data Center Expansion Rapidly expanding Denver-based company seeks Programmer/Analysts with strong exposure to OS/MVS, CICS, and VSAM. Rapid career growth. To **$35,000.**

CAD/CAE Software Engineers Growing CAD/CAE software firm seeks professionals with three or more years of experience to build state-of-the-art products. Requires one of the following: "C", PASCAL, Assembly Language, Graphics, or UNIX Internals. To **$45,000.**

IMS — New Development Multiple openings. Growing multi-billion dollar corporation seeks professional for a major long-term development project utilizing IMS DB/DC. Outstanding opportunity to join a well-managed development group to design and build new on-line systems. Denver location. To **$40,000.**

Southern California

Communications Analyst Growing San Diego government consulting firm seeks professionals experienced in Secure Communications or Verification and Validation. To **$45,000.**

Project Leader — Loans Suburban San Diego company needs a Team Leader to supervise the modification and installation of a major loan system. To **$40,000.**

Systems Analyst — IDMS Major San Diego MIS group needs a Group Leader to support IDMS and CICS applications. Heavy interface with database support group. To **$38,000.**

DEC-VAX System Programmer Northern San Diego software company seeks a professional to manage and tune its VMS system. Interface with applications programmer and assist in training. To **$45,000.**

Programmer/Analyst — MSA Medium-sized San Diego manufacturing company is installing additional MSA modules. Install and modify systems in IBM-COBOL. To **$35,000.**

Financial Systems Analyst Rapidly expanding financial institution is seeking a computer professional with solid systems analysis ability who has served as a Project Leader. Experience in on-line systems in IBM COBOL and Assembler environments is highly preferable. Facility is located in one of the most beautiful sections of San Diego. To **$40,000.**

MVS Systems Programmer Large San Diego-based organization seeks a professional to assist in the upgrade to MVS utilizing multi-CPU's and a large network of terminals. The company is one of the most stable organizations in the San Diego area, yet one of the most progressive in keeping up with state-of-the-art technology. To **$45,000.**

Graphics Programmer/Analysts One of San Diego's premier graphics software firms has several positions available for individuals with a background in FORTRAN. To **$45,000.**

Texas/Oklahoma

Software Engineer Excellent opportunity to research and develop new microprocessor products for major vendor in Houston. A degree in either EE or CS sought as well as experience in one or more of the following: hardware/software device drivers, peripheral interfaces, teleprocessing control software, Assembly, or 'C'. To **$50,000.**

Systems Engineer — New Product Development New PC product line is being developed by this major hardware vendor in Houston. Experience with hardware/software interfaces, telecommunications and operating systems is vital to this research and development effort. Convenient suburban location. To **$40,000.**

HP 3000 Programmer/Analysts — Become a Senior P/A. Multiple positions available with successful manufacturing organization located in southwest Houston. Knowledge of FORTRAN and COBOL on a mini-computer system sought. Manufacturing systems exposure essential. To **$37,000.**

Systems Analyst Assume total responsibility for designing and developing new data communications network. Solid technical background in developing data transmission networks needed. Houston. To **$55,000.**

Programmer/Analyst and Project Leader Leading energy firm is expanding its corporate data center in downtown Houston. Development opportunities exist for person with two or more years of OS/COBOL experience with some exposure to a major DBMS. Energy applications experience is not required. To **$40,000.**

Systems Analyst, Database Analyst and Sr. Programmer/Analyst Suburban Fortune 500 company in Houston is staffing for mainframe development projects on financial systems using COBOL and IDMS. To **$45,000.**

Software Engineer — Technology Leader Dallas office of Fortune 500 firm, in new facilities on a campus-like setting, seeks Software Engineer to develop microcomputer software on Intel 8085, 8086 and 8088 processors. Real-time operating system and communications software. To **$41,000.**

Programmer/Analysts — IMS DB/DC Projects Corporate staff of a rapidly expanding Fort Worth Fortune 500 organization has an immediate need for an experienced professional with a strong OS/COBOL background. All application projects are new and involve IMS DB/DC development. To **$32,400.**

CAD/CAM Software Developer North Dallas, state-of-the-art manufacturing firm developing VAX and Micro CAD/CAM systems for new products seeks software professional with PASCAL and VAX exposure. To **$38,000.**

Data Base Analysts — Advanced Technology Headquarters of world-wide high technology firm based in Dallas seeks DBA's for several applications groups (manufacturing, financial) and the newly formed Central Advanced Technology Group. Will determine data base/communications direction for the next ten years. To **$50,000.**

Lead Systems Programmer — CICS or VTAM Major Dallas-based distributor seeks OS/MVS Systems Programmer with either CICS or VTAM expertise to supervise small group of technical support software people. New facilities, excellent growth potential. To **$44,000.**

Programmer/Analysts — Data Base Project Transaction-driven on-line and data base oriented project moving into coding and implementation phase. IDMS or CICS skills preferred. COBOL or ALC acceptable. Dallas. To **$42,000.**

Technical Director — Software Development High growth firm seeks a research-oriented Technical Director with strong data and voice communications software design and implementation. Requires UNIX and C; prefer Technology applications. Dallas. To **$76,000.**

APL Programmer Major San Antonio corporation seeks professional for a career position with investments systems group. Two or more years APL programming and financial/accounting experience required. Excellent facilities and benefits. To **$35,000.**

MVS Systems Programmer Major software vendor needs a professional with five years experience with MVS internals. Beautiful Texas Hill Country location. First class technical organization. To **$40,000.**

SCADA Software/Hardware Specialist International leader in the development of real-time interactive on-line process control has just moved into new corporate headquarters. The phenomenal customer response to their SCADA product has given rise to tremendous growth. These *new* positions will all share this growth and success. Beautiful rural location convenient to a major metro area. To **$47,000.**

DP Supervisor South Texas hospital seeks professional with supervisory background in computer operations and experience with Shared Medical or McAuto hospital systems software. Mild winters. Beautiful Texas Hill Country location. To **$30,000.**

Software Engineers Major computer manufacturer has multiple openings in its San Antonio facility for professionals with office automation systems development experience. "C", PASCAL, and LAN experience preferred. To **$60,000.**

Data Base Analyst Rapidly growing software developer seeks a DBA with three or more years experience with IMS and either IDMS, DL/1, or DB2. Participate in a solid, ground floor development project. To **$45,000.**

Programmer/Analyst Large insurance company with outstanding benefits and a four day work week seeks a professional with life insurance systems experience in an IBM-OS environment. Participate in professional team atmosphere. Continuing education program available. To **$34,000.**

Sales Representative South Texas offices of a major computer systems vendor seek a professional with two or more years successful sales experience. Office automation and small business information processing systems background required. Business degree necessary. Package to **$45,000.**

Systems Programmers Multiple openings for Systems Programmers with IBM, MVS and/or IMS internals. JES2 experience and telecommunications background a plus. Outstanding opportunity with state-of-the-art shop. Great benefits and location. To **$45,000.**

Programmer Big Eight Consulting Group. High-growth position with career path into management consulting or possible partnership. Requires one or more years experience programming in RPG III. To **$35,000.**

Consultant — Fourth Generation Leader Rapidly growing Houston-based firm seeks Consultant with expertise in state-of-the-art fourth generation language (RAMIS, FOCUS or NOMAD) in large mainframe or mini environments. Outstanding facilities and compensation package, including fully company paid benefits and a lucrative employee bonus program. Career paths into sales, sales support or management available. Package to **$50,000.**

Technical Systems Analysts Recently-formed data center in a highly desirable surburban Houston location is expanding its use of relational 4GL tools. Requires five to seven years of design experience using large mainframe technology and a major DBMS (IDMS, Model 204, ADABAS, NOMAD, etc). To **$60,000.**

Systems Programmer — Learn MVS Oklahoma corporation seeks qualified Systems Programmers with a minimum of two years experience in Systems Programming. State-of-the-art environment. To **$40,000.**

Banking Programmer/Analyst — Major Expansion Major Oklahoma Bank with beautiful facilities needs professionals with minimum of two years IBM COBOL experience. To **$33,000.**

Microcomputer — Systems Engineer Successful microcomputer vendor in Oklahoma City seeks an experienced VAX VMS COBOL Programmer with three or more years experience. Position provides a dynamic work environment with excellent benefits. To **$35,000 + car.**

CICS Systems Programmer Outstanding development opportunity with full cross-training in MVS/XA, IDMS and network technology. Excellent career path. Paid overtime. To **$50,000.**

Senior Programmer/Analysts — Systems Analysts This truly outstanding opportunity offers more career options than any other firm in the Southwest. Multiple career paths and full training into management in both DP and User Departments. Multiple locations available in several desirable environments. Requires three or more years OS/MVS, COBOL and IDMS, ADS/O, etc. Houston location. To **$45,000.**

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If you are ready to move to the leading edge of microwave and satellite communication technologies, move with the leader. As a **Network Planner,** you will be responsible for voice and data Network planning and project management to ensure that network requirements are met in a timely and cost effective manner. **Requires:**

- In-depth technical knowledge of OSI/SNA, ISDN, X.25, LAN, etc.
- Extensive background on VAN, International Networking Services, and other network technologies.
- Ability to evaluate and recommend networking products, services and solutions to accommodate concentration, consolidation and integration of the data, text, and video.
- 5+ years diverse experience in networking.

Telecommunications Analyst

Acting as Senior Technical Consultant for the Network Software Staff and user community, you will analyze vendor supplied software and conduct feasibility and systems compatibility studies. **Requires:**

- 5+ years experience in Network System Software, planning, design, tuning and programming for large-scale Networks.
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The Department of Computer Systems currently has openings. Our expansion and reorganization has created a need for:

SYSTEMS PROGRAMMER IV - ON-LINE SYSTEMS MANAGER. Senior technical position for on-line systems and data communications, including TP operating software and products, FEP hardware and software, systems and programming standards, network performance and security. Strong current technical skills in above areas with previous on-line application responsibilities required. Technical experience must include current large multi-frame hosts and distributed systems.

SYSTEMS PROGRAMMER IV - VAX SYSTEMS MANAGER. Senior technical position for VAX systems. Must have comprehensive technical knowledge of current VAX hardware, VMS software and system products, DEC data communication architecture and protocols and system planning techniques. Responsibilities include operating software and product maintenance, configuration planning and control, utilization and performance management, DASD management, network configuration and control and system management standards. Experience which includes VAX systems interface to large mainframe is a plus.

SYSTEMS ANALYST IV - Several openings are available for experienced Systems Analysts to direct project teams in planning survey strategy, developing and implementing of technical systems analysis and design, as well as organization and procedures analysis. Requirements include ability to communicate data processing concepts to non-technical personnel as well as comprehensive knowledge and experience in systems analysis and design.

The Phoenix area has an outstanding living environment and Maricopa County provides competitive salary and benefit plans, and professional challenge worthy of the best.

For additional information, submit your resume by March 28, 1986, to **Maricopa County Personnel Department, Recruiting and Selection Division, 2nd Floor, 111 South Third Avenue, Phoenix, Arizona, 85003.** Please specify the position of interest and provide one resume for each position for which you are applying.

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The MITRE Corporation, a well-established company providing C³I and civilian systems engineering services to a wide range of U.S. government agencies, is seeking individuals to assist management in developing and maintaining several management systems to support current and planned DoD hardware configurations at our San Antonio site facility. Specific areas of involvement include computer and network performance management/evaluation, disk management, data integrity and security, and load/usage analysis for both hardware and software. To qualify, you must have a BS/MS in Computer Science or Electronic Engineering, plus 2–7 years of experience. A knowledge of data processing, systems programming, hardware and software configuration management, and microcomputer hardware/software is also essential.

Please forward your resume and cover letter indicating area of interest to J.P. Goudarzi, The MITRE Corporation, 1820 Dolley Madison Blvd., McLean, VA 22102. Or call 1-800-336-0430. U.S. Citizenship required. An Equal Opportunity/Affirmative Action Employer.

For similar C³I opportunities at our Boston facilities, please send resume to Mr. David L. Finnegan, The MITRE Corporation, 2207 Middlesex Turnpike, Bedford, MA 01730. U.S. Citizenship required.

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P/A Tandem TAL, ACI a plus	To $38K
P/A Burroughs IPS	To $33K
Sr. P/A IMS DB/DC, Mfg.	To $40K
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Technical Representative to provide high level technical support for internal staff and external clients for the Remote Computing Services Department. B.S. in Business/Information with 3 years experience in software support/end user computing required. Salary: $27,504. Contact the Job Service Office at 700 Wade Ave., Raleigh, N.C. or the Job Service nearest you. Refer to Job Order #NC5132617.

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Small, highly profitable insurance company needs programmer/analyst. Position requires:

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SYSTEMS ANALYST - Determine software requirements; evaluate system effectiveness; design, implement and maintain new systems and programs; problem solving and system correction; develop user manuals and instruct and train EDP personnel. Duties involve extensive use of IBM 4300 computer hardware, COBOL, DL/1, CICS, IMS, VSAM and OS/MVS. Bachelor's degree in Computer Science or Engineering and two years of experience as a systems analyst required. 40 hours per week $34,000 per annum salary. Mail resume to: NYS Job Service J.O. #8012095, 97-45 Queens Blvd., Rego Park, NY 11374.

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- **CICS Application Programmers** —To qualify for the CICS positions you will need 3–5 years' experience in the CICS Macro Level area with an assembler programming expertise.
- **Assembler Programmers**— These positions require 2–3 years' experience in the IBM assembler programming area.

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SENIOR PROGRAMMER ANALYST

You will design and transform user requirements into an application program for a data processing system. Working on highly complex projects, you will also be responsible for providing technical leadership to junior personnel. Five years programming experience with four years in systems development using COBOL is required. (Job Code 600-1)

PROGRAMMER ANALYST

You will develop functional requirements and documentation based on accepted user criteria, prepare system test procedures, and work independently on complex projects related to specific phases of application programming. Three years programming experience with two years in systems development using COBOL is required. (Job Code 600-2)

For **Sr. Programmer Analyst and Programmer Analyst** positions, a Bachelor's degree or equivalent in Computer Science, Math, Engineering or Business is preferred. Previous experience with large-scale IBM systems and IMS DB/DC required; experience in distributed data processing systems a plus.

DATA BASE ADMINISTRATION ANALYST

You will design and install IMS data bases for large-scale IBM systems. You must have a minimum of three years experience with two years in systems development and IMS DB/DC experience. Experience preferred in: Monitoring data bases for performance; logical and physical data base design, data base reorganization and recovery procedures and utilities; PSB and DBD creation. **Positions available in Memphis and Colorado Springs.** (Job Code 600-3)

QUALITY ASSURANCE ANALYST

You will participate in the development of a quality assurance function to include such areas as: Change control, system test, monitoring of standards and procedures, implementation of a structured methodology and system design reviews. You must have a minimum of three years data processing experience with two years in systems development using COBOL and strong interpersonal skills. IMS knowledge and experience with systems test, design reviews, change control or structured methodology preferred (Yourdon). **Positions available in Memphis and Colorado Springs.** (Job Code 600-4)

SENIOR COMMUNICATIONS SYSTEMS PROGRAMMER-DISTRIBUTED COMMUNICATIONS SUPPORT

You will join a new group being formed to support our rapidly expanding distributed network; consult on and design custom communications protocols to support corporate projects; and write system level code to interface intelligent devices to each other, our large IBM SNA network, and our X.25 network. You must have five years recent experience in data processing, including three years in communications software, and experience with design and analysis of communication protocols. Tandem experience a definite advantage. Familiarity with micro-operating systems and knowledge of COBOL, Assembler, IMS, or VTAM a plus. A Bachelor's degree or equivalent in Computer Science preferred. Good communication, organization/planning skills are essential. (Job Code 600-5)

SENIOR COMMUNICATIONS SYSTEMS PROGRAMMER-IBM MAINFRAME

You will consult and plan configurations and ensure appropriate hardware/software support for our large ACF/VTAM, ACF/NCP network, supporting such products as NCCF, NTO, NPM, and MSNF. You must have five years data processing, including three years experience in system software support and a working knowledge of MVS, VTAM, NCP, Assembler, and communication hardware concepts. COBOL programming skills and knowledge of communication protocols are preferred. (Job Code 600-6)

TECHNICAL ADVISOR—SYSTEM PERFORMANCE & ANALYSIS

You will be responsible for performance analysis of each major systems's DASD configuration and improvement recommendations using MICS, SMF/RMF, OMEGAMON, RESOLVE, TESTDATA response time monitor, BEST1, MAP and CMS models. You must have seven years programming experience, including five years in systems programming for large IBM mainframes and demonstrated technical skills in implementing major IBM systems software. A Bachelor's degree or equivalent in a computer related field and experience with the above mentioned tools are preferred. (Job Code 600-7)

DASD MANAGEMENT

You will be assisting on configuration, performance, space management and all phases of DASD utilization. You must have three years data processing experience with at least one year in DASD management in a large IBM shop. Must be able to use UCC-3, DMS, or HSM. Systems programming experience a plus. Strong JCL skills required. (Job Code 600-8)

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MARICOPA COUNTY PHOENIX, ARIZONA

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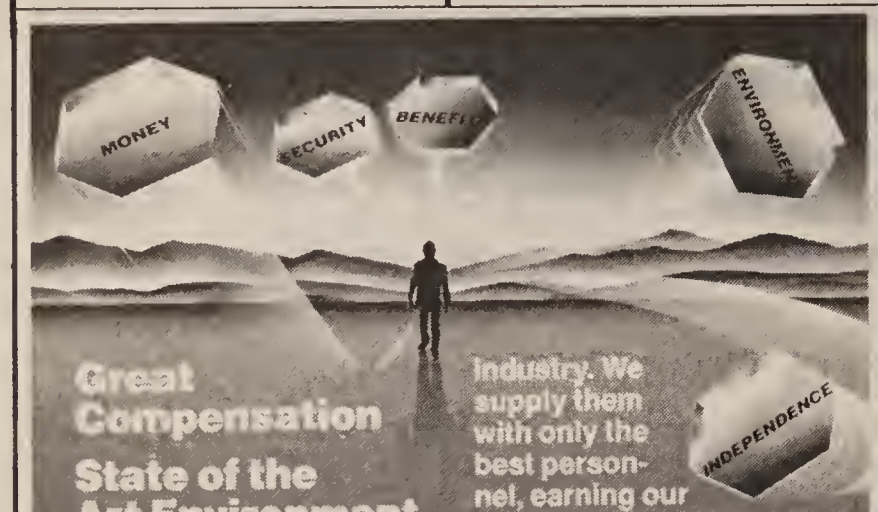

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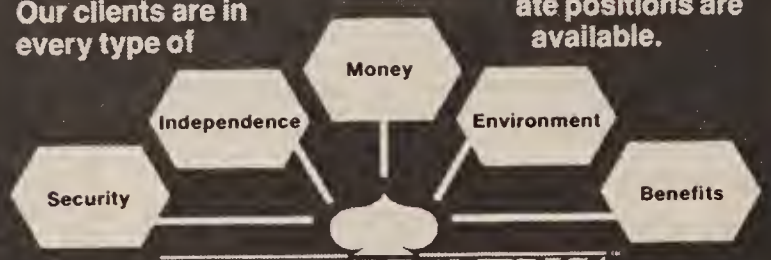

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Chip dumping charges upheld

Commerce orders five Japan firms to post bond

By Maura McEnaney

WASHINGTON, D.C. — The U.S. Department of Commerce last week supported three U.S. chip maker's contentions that four Japanese firms dumped erasable programmable read-only memory (EPROM) chips into the U.S. market.

In a preliminary ruling on a complaint from Advanced Micro Devices, Inc., Intel Corp. and National Semiconductor Corp., the Commerce Department ordered a bond to be posted on all future EPROM chip imports by four Japanese firms.

The amount of the bonds will vary depending on the what Japanese chip makers charge for their products and what the department considers to be a fair market value.

Chip dumping margins cited

The department cited EPROM chip dumping margins of 21.7% for Toshiba Corp., 29.9% by Hitachi Corp., 145.9% by Fujitsu Ltd. and 188% by NEC Corp.

Separately, the department ruled that those four firms and Mitsubishi Electric Corp. also illegally dumped 256K dynamic random-access memory chips in the U.S. market. On the complaint filed in December by the U.S. government, the department determined dumping margins on those chips of 108.7% by NEC and Mitsubishi, 74.3% by Fujitsu, 49.5% by Toshiba and 19.8% by Hitachi.

It will be up to the International Trade Commission to determine whether U.S. firms have been injured by the EPROM chip dumping. That determination will establish what portion of the bonds, if any, will be returned to the Japanese vendor.

In a departure from historic legal approaches to trade issues, executives from both Japanese and American chip firms were scheduled to meet last weekend in Los Angeles to discuss what they could do to resolve the trade problem. The meeting was proposed by Sony Corp.'s Akio Morita, chairman of the Japan Electronics Industry Promotion Association.

U.S. chip makers also received encouraging news last week from the Semiconductor Industry Association's February book-to-bill ratio of 1:10, which means that for every $100 worth of new product shipped, manufacturers received $110 of new orders. It was the highest order rate in two years.

Computerworld News Service Editor Edward Warner contributed to this story.

Prime interest attracts Wall Street attention

ACTIVE ISSUES
Kathy Porteus

After an impressive 1985, what should one expect from Prime Computer, Inc. (PRM — 24⅜)?

Unlike many of its competitors last year, Prime managed to score significant revenue and earnings gains while winning friends on Wall Street. Last month, Prime's stock traded at 27, reflecting the general rally and investor confidence that the company's good news would continue.

Most analysts praise Prime's product and marketing strategies. Yet recent industry news, such as IBM's acknowledgment of revenue pressure, causes some analysts to wonder if Prime can pull off another surprisingly positive year. According to Craig Symons, a financial analyst with Gartner Securities, capital spending still appears very weak, and the cyclical recovery hoped for in the December quarter has not materialized.

This news, coupled with Prime management's indication that earnings estimates above $1.40 a share may be too optimistic, explains Prime's recent retreat to 24, according to Thomas E. McCrann, a vice-president with Merrill Lynch, Pierce Fenner and Smith, Inc. Many analysts currently estimate Prime will earn $1.45 a share in fiscal 1986, which ends Dec. 31.

"The risk in Prime's stock," McCrann says, "is a body of opinion that maintains Prime will exceed management's guidance again this year. I think that is not too likely with the market toughening up."

Analysts surmise that Prime's short-term stock performance will resemble that of other minicomputer issues as more investors back off from overly optimistic expectations. Nevertheless, Prime, along with Digital Equipment Corp., remains a favorite mini company among analysts, despite economic uncertainties nagging the industry.

"The strength at Prime right now," says Jay Stevens, first vice-president with Dean Witter Reynolds, Inc., "is its understanding of how to sell computers." Capitalizing on this strength, Prime increased its direct sales force by about 50% during the past 18 months and plans to expand its sales efforts by at least another 20% in 1986.

Prime also continues to develop its indirect distribution channels, which account for about 17% of revenue. "Prime can only expand its direct sales force so fast," Gartner's Symons says, "and so it looks to third-party distribution to leverage some of the spending." Such internal expansion will create self-imposed margin pressure for Prime this year, as it did in 1985.

Considering its relatively limited resources, Prime continues to roll out good products at a remarkable clip, analysts say. This year, the company has introduced two workstations for office and engineering applications, a superminicomputer designed for government security environments and four IBM Personal Computer-compatible products.

Later in 1986, Prime should announce a high-end, 8 million instructions per second machine and a more functional office automation software package. "Prime has also been very effective with mid-life product enhancements," McCrann observes, giving users "more bang for the buck."

With more good news than bad, is Prime an investment opportunity at its current price level?

Stevens of Dean Witter recommends Prime, which in his opinion has upside potential to 30 based on 1986 earnings estimates of $1.45 a share and to 40 based on 1987 estimates of $1.80 a share.

But Symons says he would not invest in any mini companies at this time because the industry "has more corrections to undergo."

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Morrow seeks Chapter 11

From page 154

Zenith machine.

"We got as good a deal as we could have from Zenith, all things considered," Morrow said. "They wouldn't get on board for royalties, and besides, when they bought it, who's to say they wouldn't be buying a pig in a poke?"

Pivot XT introduced too late

Last week, Morrow introduced the Pivot XT, a portable IBM Personal Computer XT-compatible machine with a 10M-byte hard disk. But the introduction was too late for Morrow, already in the throes of a serious cash crunch. Last month, for example, Morrow netted a paltry $75,000 when it auctioned off microcomputer inventory originally valued at $2 million.

"We didn't reign in our appetite for cash, although we have cut down our debt to the bank from $7.5 million to $2.5 million, and we didn't move from an 8-bit to a 16-bit machine as intelligently as we should have," Morrow said. "Together, the two proved to be too much."

Despite his company's plummet from annual sales as high as $28 million in its late 1970s heyday, Morrow is still able to laugh at himself and the computer business. "I've learned a new oxymoron from all of this," he said. "It's called 'inventory control.' "

3Com chairman discusses merger

From page 154

enhanced products to differentiate them from straight IBM dealers. "We volunteer," he said.

3Com's annual retail business, currently at $40 million, is targeted to expand tenfold to $400 million in the next three to five years, mainly through the introduction of new products. The 3Com name will remain and will be the trademark on all retail channel products.

Metcalfe said that none of Convergent's current products are appropriate for the retail channel and that new products, consisting primarily of workstations and servers, will be developed. Due to the length of product development cycles, no new retail products from the merged company will appear in 1986, he said.

Convergent's annual OEM business is scheduled to be doubled to $800 million by leveraging 3Com's nets with Convergent's workstations.

Convergent's vertical market business is targeted to grow to $300 million a year through a strategy of acquisitions, designed to create a federation of vertical market companies. Last November, Convergent acquired 40% of Baron Data Systems, a $17.9 million company that integrates computer systems for court stenographers.

Convergent Technologies' chief executive officer, Paul C. Ely Jr., will become chairman and CEO of the new company, and he will be responsible for the vertical market effort. 3Com President and CEO L. William Krause will become president and chief operating officer and be responsible for the OEM and retail segments.

Ashton-Tate reports strong earnings

By Douglas Barney

TORRANCE, Calif. — Based on strong sales of Dbase III Plus and Framework II and the acquisition of Multimate International Corp. last year, Ashton-Tate reported a 122% increase in profits last week for its fiscal year ended Jan. 31.

Ashton-Tate reported $16.6 million in earnings, compared with $7.5 million in fiscal 1985. Sales for the fiscal year were $121.6 million, a 47.7% increase over sales of $82.3 million the previous year.

The firm also reported last week that it is preparing to file a registration statement with the Securities and Exchange Commission to offer 1.3 million shares of Ashton-Tate common stock.

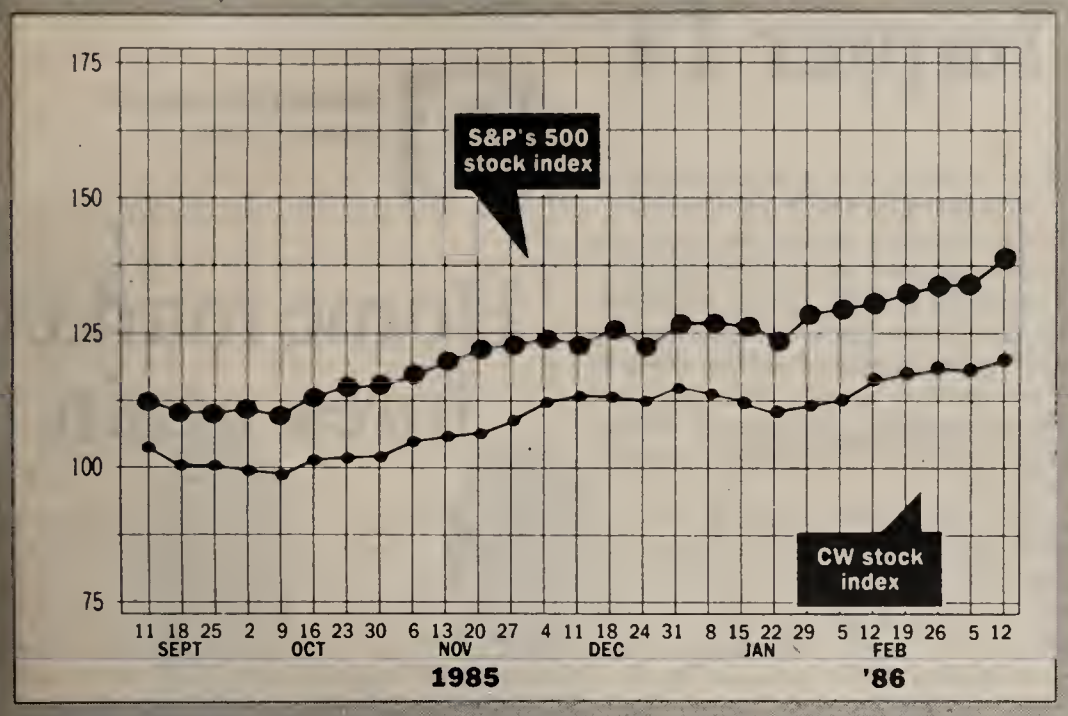
At its current value of approximately $20 per share, the offering should bring in more than $20 million to be used for working capital and other general corporate needs. The filing will occur within three weeks, the firm said.

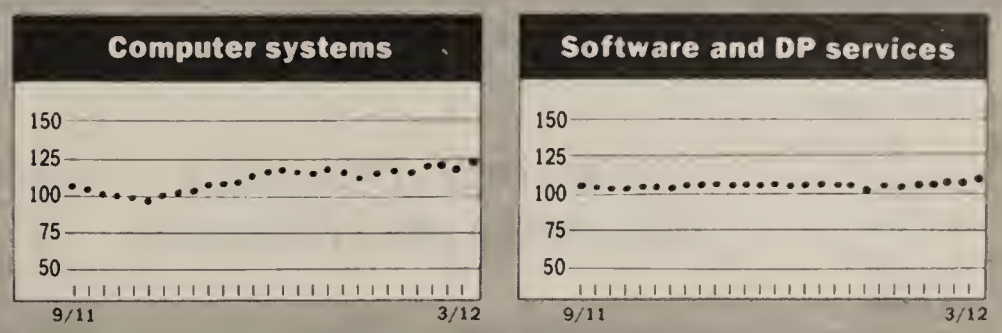
The software vendor also announced that Dbase series author and Ashton-Tate chief scientist Wayne Ratliff has resigned to pursue other projects through his own firm, Ratliff Software Productions, Inc. Ratliff cited his uneasiness with the corporate environment at Ashton-Tate as a reason for his departure.

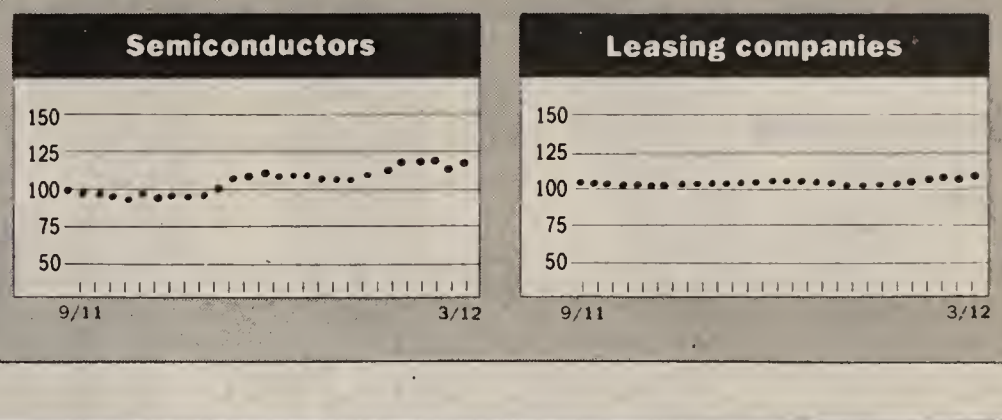
COMPUTER INDUSTRY

MITCHELL J. HAYES

Computerworld stock trading index







All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	3/5/86	3/12/86
Computer systems	118.4	**122.4**
Software and DP services	104.5	**105.1**
Peripherals and subsystems	117.3	**119.6**
Supplies and accessories	145.4	**150.9**
Semiconductors	107.4	**111.9**
Leasing companies	103.4	**104.0**
CW stock index	116.1	**118.9**
Standard and Poor's 500 stock index	134.1	**139.0**

Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, MARCH 12, 1986

EXCH		52-WEEK RANGE (1)	CLOSE MAR 12 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	5- 9	5 3/4	-1/8	-2.1
O	ALTOS COMPUTER SYST	9- 17	16 5/8	+1	+6.3
A	AMDAHL CORP	10- 18	15 7/8	-1/8	-0.7
O	APOLLO COMPUTER	9- 31	16 1/8	+7/8	+5.7
O	APPLE COMPUTER INC	14- 31	24 3/4	-1/2	-1.9
N	AT&T	19- 28	23 1/8	+5/8	+2.7
N	BURROUGHS CORP	52- 71	68 1/4	+2 7/8	+4.3
O	COMPAQ COMPUTER CP	5- 16	15 5/8	+3/8	+2.4
O	COMPUTER AUTOMATION	1- 9	1 7/8	-1/4	-11.7
A	COMPUTER CONSOLES	5- 14	8	+1 5/8	+25.4
N	CONTROL DATA CORP	15- 39	24 1/2	+1 7/8	+8.2
O	CONVERGENT TECHNOL	5- 13	11 1/8	+1/8	+1.1
O	CPT CORP	5- 8	6 1/8	+3/8	+6.5
N	CRAY RESEARCH INC	25- 74	73 1/2	+3 1/4	+4.6
O	DAISY SYSTEMS CORP	11- 38	11 1/2	+1/4	+2.2
N	DATA GENERAL CORP	31- 76	37 1/8	-1	-2.6
N	DATAPOINT CORP	5- 22	5 3/8	0	0.0
N	DIGITAL EQUIPMENT	85- 167	164 3/4	+3 5/8	+2.2
A	EECO INC	13- 16	14 1/2	-1/8	-0.8
N	ELECTRONIC ASSOC.	3- 6	5 3/4	+7/8	+17.9
N	FLOATING POINT SYST	18- 37	31 3/8	-1 1/4	-3.8
N	FOXBORO	22- 31	27 1/4	+1	+3.8
N	GOULD INC	20- 38	27 5/8	-1/2	-1.7
N	HARRIS CORP	22- 35	29 1/8	-5/8	-2.1
N	HEWLETT-PACKARD CO	29- 45	44 1/2	+3 1/4	+7.8
N	HONEYWELL INC	54- 87	76 1/2	+2 5/8	+3.5
N	IBM	117- 158	149	+5/8	+0.4
O	IPL SYSTEMS INC	1- 4	2 1/4	+1/8	+5.8
N	ITT CORP	28- 44	43 5/8	+1/2	+1.1
N	M/A-COM INC	13- 24	17 3/8	+1	+6.1
N	MANAGEMENT ASSIST	2- 28	2 1/8	0	0.0
N	MATSUSHITA ELEC(ADR)	49- 72	71 7/8	+2 3/4	+3.9
O	MENTOR GRAPHICS	13- 30	15 3/4	+3/4	+5.0
N	MODULAR COMPUTER SYS	6- 8	6 1/2	-1/4	-3.7
N	MOHAWK DATA SCI	1- 13	2 3/4	+1/2	+22.2
N	NBI INC	11- 20	13 7/8	+7/8	+6.7
N	NCR	25- 46	44 5/8	+3 1/8	+7.5
N	PERKIN-ELMER	22- 36	34 3/4	+1 3/4	+5.3
N	PRIME COMPUTER INC	15- 27	24 5/8	+3/8	+1.5
N	SPERRY CORP	39- 59	52	+2	+4.0
O	STRATUS COMPUTER INC	9- 25	20 1/4	+1 1/2	+8.0
O	TANDEM COMPUTERS INC	13- 29	25 3/8	+1/4	+0.9
N	TANDY CORP	24- 42	41 7/8	+1	+2.4
O	TELEVIDEO SYSTEMS	2- 4	3 7/8	0	0.0
O	TELXON CORP	10- 27	27 1/4	+1 1/4	+4.8
N	TEXAS INSTRUMENTS	86- 132	126 1/2	+5 1/8	+4.2
A	ULTIMATE CORP	8- 32	29 1/4	-2 3/4	-8.5
O	VECTOR GRAPHICS INC	1- 1	1/8	0	0.0
A	WANG LABS "B"	15- 29	21 3/4	+1 3/4	+8.7
A	WANG LABS "C"	15- 29	21 3/8	+1 3/8	+6.8
N	XEROX CORP	37- 72	71 1/2	+1 1/2	+2.1
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	21- 35	33 1/2	+1 7/8	+5.9
N	BARRY WRIGHT	17- 29	22 1/8	+1 1/2	+7.2
A	DUPLEX PRODUCTS INC	13- 22	19 1/2	-1/2	-2.5
N	ENNIS BUS. FORMS	14- 27	27 3/8	+1 1/2	+5.7
N	3M COMPANY	74- 101	101	+4 3/8	+4.5
N	MOORE CORP LTD	15- 25	25 1/4	+1	+4.1
O	STANDARD REGISTER	22- 39	39	+3/4	+1.9
N	WALLACE COMP SERVICE	30- 46	45 5/8	+1 1/8	+2.5

EXCH		52-WEEK RANGE (1)	CLOSE MAR 12 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & DP SERVICES				
O	ADVANCED COMP TECH	2- 5	4 3/8	-3/8	-7.8
N	ADVANCED SYSTEMS INC	9- 20	19 3/8	-3/4	-3.7
N	AGS COMPUTERS INC	10- 25	22 7/8	+1/8	+0.5
O	AMERICAN SOFTWARE	9- 15	10 1/4	+1 1/4	+13.8
N	ANACOMP INC	2- 5	4 5/8	+1/4	+5.7
O	ANALYSTS INTL CORP	5- 11	5 3/4	+1/2	+9.5
O	ASHTON TATE	6- 23	21 3/8	+1/2	+2.3
O	ASK COMPUTER SYSTEMS	7- 25	12 3/4	0	0.0
B	ASTRADYNE COMP IND	1- 3	2 1/4	0	0.0
N	AUTOMATIC DATA PROC	35- 70	69 1/2	+4	+6.1
O	COMPUTER NETWORK	5- 9	5 1/4	0	0.0
O	COMPUTER ASSOC INT'L	18- 37	35	+1/4	+0.7
O	COMPUTER HORIZONS	5- 13	12 1/2	+1/4	+2.0
N	COMPUTER SCIENCES	13- 36	36 1/4	+1 1/4	+3.5
O	COMPUTER TASK GROUP	10- 26	26	0	0.0
O	COMPUTER USAGE	1- 3	2	+3/8	+23.0
O	COMPUTONE SYSTEMS	4- 11	3 7/8	-1/8	-3.1
O	COMSERV CORP	1- 6	4 1/2	+1	+28.5
O	COMSHARE	7- 12	11	+1/4	+2.3
N	CULLINET SOFTWARE	13- 33	14 3/8	-3/8	-2.5
O	CYCARE SYSTEMS INC	19- 27	26 1/2	+2 3/4	+11.5
O	HOGAN SYSTEM INC	4- 12	6 7/8	-3/4	-9.8
N	GENERAL ELECTRIC CO	56- 77	77	+1 7/8	+2.4
N	GENL MOTORS E (EDS)	20- 47	45 5/8	+3	+7.0
N	GTE CORP	38- 51	51 3/8	+5/8	+1.2
O	INFORMATION SCIENCE	1- 5	3	+1/2	+20.0
O	INFOTRON SYSTEMS CP	13- 24	17 3/4	0	0.0
O	KEANE ASSOCIATES	10- 20	14	+7/8	+6.6
N	LOGICON	25- 43	37	-1/4	-0.6
O	LOTUS DEVELOPMENT CP	15- 34	26	+2 1/2	+10.6
O	MCI COMMUNICATIONS	7- 13	13	+3/4	+6.1
O	MNGT SCI AMER INC	7- 16	13 5/8	+1/2	+3.8
O	MATHEMATICAL APP GRP	1- 8	1 7/8	0	0.0
O	MICOM SYSTEMS INC	12- 35	18 1/4	+2 1/2	+15.8
O	MICROPRO INT'L CP	2- 4	2 1/2	+3/8	+20.6
O	NATIONAL DATA CORP	8- 19	19 1/8	+1/4	+1.3
O	ON-LINE SOFTWARE INT	4- 12	11 1/2	+1	+9.5
N	PANSOPHIC SYSTEMS	14- 30	28 7/8	+7/8	+3.1
N	PLANNING RESEARCH	11- 20	20	+3 3/8	+20.3
O	POLICY MGMT SYSTS CP	16- 35	17 1/2	+3/4	+4.4
O	PROGRAMMING & SYS	4- 9	8	-1/2	-5.8
O	REYNOLDS & REYNOLD	31- 63	62 3/4	+2 1/4	+3.7
O	SEI CORP	13- 27	25 3/4	0	0.0
O	SHARED MEDICAL SYST	26- 38	38 1/4	+1 5/8	+4.4
O	SCIENTIFIC COMPUTERS	5- 8	4 7/8	-1/4	-4.8
O	SOFTWARE AG	12- 22	18 5/8	+1/4	+1.3
N	URS CORP	10- 17	16 3/4	+2	+13.5
N	UCCEL	11- 18	18	+1/2	+2.8
O	VM SOFTWARE	17- 24	18	-1/2	-2.7
	SEMICONDUCTORS				
N	ADVANCED MICRO DEV	22- 36	31 3/4	+1 3/8	+4.5
O	ADV'D SEMICONDUCTOR	7- 23	13 1/2	+3/8	+2.8
N	ANALOG DEVICES INC	18- 31	29 3/4	+5/8	+2.1
O	ANALOGIC CORP	11- 16	13 7/8	+5/8	+4.7
N	APPLIED MAGNETICS CP	9- 19	19 1/4	+1 1/8	+6.2
O	AVANTEK	18- 26	20 3/8	+1 3/4	+9.3
O	HADCO CORP	3- 7	4 5/8	-1/8	-2.6
O	INTEL CORP	21- 33	28 1/2	+1 1/4	+4.5
O	MICRO MASK INC	6- 12	6 1/2	+5/8	+10.6
N	MOTOROLA INC	29- 45	44 1/2	+3	+7.2
N	NAT'L SEMICONDUCTOR	10- 15	14 1/4	+5/8	+4.5
N	TERADYNE	17- 33	25 1/8	+1 1/8	+4.6

EXCH		52-WEEK RANGE (1)	CLOSE MAR 12 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	3- 8	7 5/8	-1/4	-3.1
A	ANDERSON JACOBSON	2- 5	2 1/4	0	0.0
O	AST RESEARCH INC	7- 33	18 5/8	-5 3/8	-22.3
O	AUTO-TROL TECHNOLOGY	3- 13	5 7/8	+3/8	+6.8
O	AVANT-GARDE COMPUTNG	3- 21	5	+1/4	+5.2
O	BANCTEC INC	6- 12	9 1/2	+1 1/2	+18.7
O	BEEHIVE INT'L	1- 2	1/8	0	0.0
N	BOLT,BERANEK & NEW	20- 39	38 3/4	0	0.0
O	CAMBEX CORP	1- 3	1 1/4	-1/2	-28.5
N	CENTRONICS DATA COMP	3- 11	5 5/8	+1/2	+9.7
A	CETEC CORP	6- 9	8 3/4	+1/2	+6.0
A	COGNITRONICS	4- 7	4 3/8	-1/4	-5.4
N	COMPUGRAPHIC CORP	23- 36	25 1/2	+1/8	+0.4
O	COMPUTER TRANSCEIVER	0- 1	5/8	0	0.0
N	COMPUTERVISION CORP	9- 44	16 5/8	+5/8	+3.9
N	CONRAC CORP	12- 18	16 7/8	+1/8	+0.7
A	DATAPRODUCTS CORP	11- 20	14 3/8	-1 1/4	-8.0
A	DATARAM CORP	4- 14	13 7/8	+2 5/8	+23.3
O	DATA SWITCH CORP	4- 9	5 7/8	-1/8	-2.0
O	DATUM INC	5- 9	5 3/8	-1/4	-4.4
O	DECISION DATA COMPUT	10- 20	11 7/8	+1 1/8	+10.4
O	ENDATA, INC	2- 8	5 5/8	+1/8	+2.2
O	EVANS & SUTHERLAND	12- 24	23 1/2	-3/4	-3.0
O	GANDALF TECHNOLOGIES	5- 13	5 3/4	0	0.0
N	GEN'L DATA COMM IND	8- 21	12 1/4	+7/8	+7.6
N	HAZELTINE CORP	20- 30	21 3/4	+1	+4.8
O	ICOT CORP	3- 11	11	+1/4	+2.3
O	INFORMATION INTL INC	10- 17	13 1/8	0	0.0
O	INTECOM INC	4- 11	4 1/8	-7/8	-17.5
A	LUNDY ELECTRONICS	10- 15	14 1/4	+1/8	+0.8
O	MEGADATA CORP	3- 8	3 3/8	+1/8	+3.8
A	MSI DATA CORP	7- 13	12 1/4	+3/8	+3.1
N	NASHUA CORP	24- 41	41	+1 5/8	+4.1
O	NETWORK SYSTEMS CORP	11- 27	12 1/4	+3/4	+6.5
N	NO AMERICAN PHILIPS	32- 45	43 7/8	+1/4	+0.5
N	NORTHERN TELECOM LTD	26- 41	29	+1 3/8	+4.9
O	OMEX	1- 3	3/8	-1/8	-25.0
N	PARADYNE CORP	6- 18	8 3/8	+1/4	+3.0
A	PENRIL CORP	7- 14	7 7/8	-1/4	-3.0
N	PLESSEY CO (ADR)	19- 32	31 7/8	+1 5/8	+5.3
O	PRINTRONIX INC	9- 18	12 1/8	-1/2	-3.9
O	QMS INC	6- 16	11 5/8	+1/8	-1.0
O	RAMTEK CORP	2- 7	3 5/8	+3/8	+11.5
N	RECOGNITION EQUIP	9- 17	15 1/2	+1 1/4	+8.7
N	SANDERS ASSOCIATES	30- 44	41 7/8	+1/8	+0.2
O	SCAN TRON CORP	9- 20	19 3/4	-2	-11.2
N	SCIENTIFIC ATLANTA	10- 15	13 5/8	-1/4	-1.8
O	SEAGATE TECHNOLOGY	5- 11	10 3/4	+1/8	+1.1
N	STORAGE TECHNOLOGY	1- 5	5 3/8	+7/8	+19.4
O	SYKES DATATRONICS	0- 2	1/2		+14.1
A	T BAR INC	5 9	6	0	0.0
A	TABS PRODUCTS CO	14 21	20 7/8	+5/8	+3.0
O	TANDON CORP	3- 9	5 5/8	-3/8	-6.2
A	TEC INC	6- 13	7 1/4	+3/4	+11.5
N	TEKTRONIX INC	47- 68	60 1/8	-5/8	-1.0
N	TELEX	34 68	66	+2 1/2	+3.9
O	TESDATA SYSTEMS CP	0- 3	7/8	+1/8	+16.6
N	TIMEPLEX INC	15- 23	15 3/4	+1/4	+1.6
N	TITAN CORP	4- 11	10 5/8	+1/4	+2.4
O	VISUAL TECHNOLOGY	1- 3	7/8	+1/16	+7.6
	LEASING COMPANIES				
N	COMDISCO INC	7- 10	19 3/4	+7/8	+4.6
N	CONTINENTAL INFO SYS	5- 19	18 3/4	+1/4	+1.3
O	FINALCO GROUP INC	4- 5	4 5/8	+1/8	+2.7
O	PHOENIX AMERICAN INC	2- 4	4	+1/4	+6.6
O	SELECTERM INC	7- 12	7 1/4	+3/4	+11.5
N	U.S. LEASING	32 43	41 3/4	+3 1/8	+8.0

EXCH: N = NEW YORK; A = AMERICAN; P = PACIFIC; B = BOSTON; L = NATIONAL; M = MIDWEST; O = OVER-THE-COUNTER

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Source: Trade Quotes, Inc.

COMPUTER INDUSTRY

INSIDE

Memorex looks back on a sometimes rocky 25 years in the storage business/**125**

Computerland plans a $25 million clearance sale/**129**

U.S. chip firms receive a favorable ruling on their dumping charges against Japanese competitors/**152**

INSTANT ANALYSIS

"No one buys a computer because of the MIPS, MOPS, Mflops or Whetstone speed of the CPU. The sale goes to the vendor that, for the customer's particular application, provides the shortest time between hitting the return key and seeing the answer."

— Robert J. Paluck, president and chief executive officer, Convex Computer Corp.

Morrow seeks Chapter 11

Action comes two weeks after design gets IRS award

By Maura McEnaney

SAN LEANDRO, Calif. — George Morrow could be considered one of the last pioneers of the microcomputer business. But like many of his entrepreneurial predecessors whose companies suffered a similar fate, the microcomputer market got too big too fast for Morrow Designs, Inc.

After the 10-year-old company filed for creditor protection under Chapter 11 of the U.S. Bankruptcy Code last week, "Chairman Morrow," as he titled himself in a self-published booklet of his more memorable quotations, recalled his downhill battle to save his company.

"It's been kind of like fighting Rocky Marciano," Morrow said. "You can last until maybe the 12th or 13th round, but finally Marciano is going to catch up with you."

Morrow is seeking protection from its creditors and will attempt to shed approximately $5 million in debt. Under an agreement with the Union Bank of San Francisco, Morrow will continue to sell its Pivot II portable computer, which will soon be manufactured overseas. Twelve of 35 employees will remain at the company while it seeks a buyer.

Ironically, Morrow's Chapter 11 announcement came just two weeks after the Internal Revenue Service awarded Zenith Data Systems a $27 million dollar contract for 15,000 of its Z-171 laptop portables [CW, March 3]. The Z-171 is based on Morrow's Pivot II design that Zenith purchased from the firm last year for a comparably minuscule $1.2 million — with no royalty provision for future sales of the

See **MORROW** page 152

Bulls and bears facing off over IBM's fiscal pull

By Douglas Barney

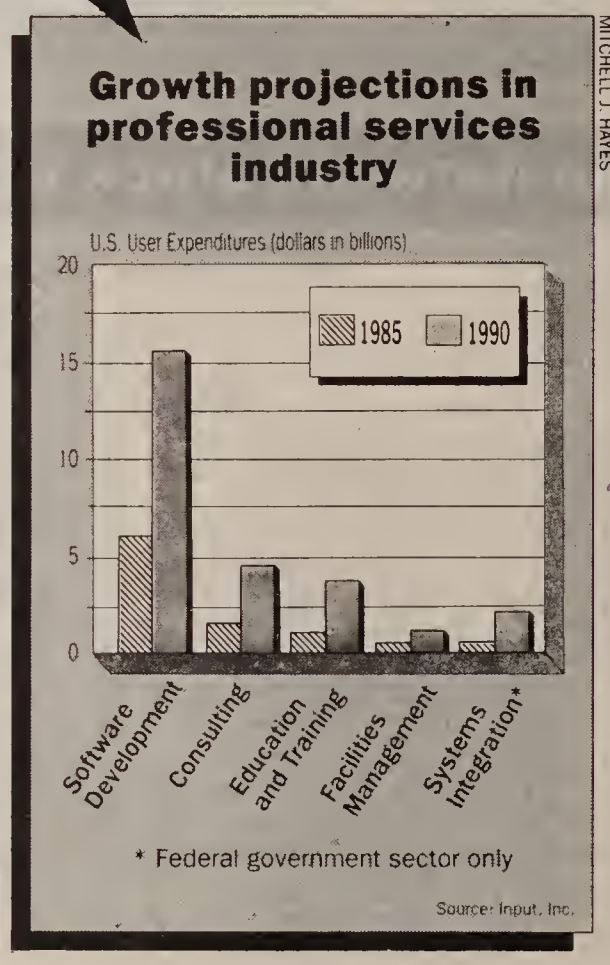
Citing intense competition from firms such as Digital Equipment Corp. in the minicomputer business, low-price clones in the personal computer business and a soft market for large systems, many analysts are reducing their 1986 earning estimates for IBM. The most bearish say IBM should brace for the worst, but the bullish, mindful of IBM's market dominance, see a brighter picture and strongly recommend IBM stock.

Bearish analysts are growling that even IBM is not immune to pressure from falling prices in the computer industry, slow overall market growth and ever-increasing competition.

Some analysts say they believe that IBM itself, with its hugely successful Personal Computer, has reduced demand for

See **BULLS** page 129

DATA VIEW



INDUSTRY INSIGHT
Maura McEnaney

Home market lures, again

Microsoft Corp. dropped some pretty clear hints about its future directions recently.

At its compact disk read-only memory (CD-ROM) conference in Seattle this month, the soon-to-go-public Microsoft said it intends to introduce CD-ROM products, which for now seem best suited for the consumer marketplace.

Conference attendees spoke of future CD-ROM applications for at-home education and training, much to the delight of Microsoft executives Bill Gates and Jon Shirley.

"We always knew some intelligent software-controlled device would address the home market," Gates wrote in the foreword of the conference's 600-page textbook. "And we knew it would have to compete with books, TV and board games in order to command the consumer's time and interest. We believe that CD-ROM enables us to create something that does compete," he wrote.

The waters of the consumer market are somewhat uncharted ones for Microsoft, whose MS-DOS operating system is firmly entrenched within the business workplace. But if its CD-ROM products turn out to be anything like the company's slick presentation to conference attendees, Microsoft no doubt will be a leader in the CD-ROM marketplace, particularly as it evolves into the sophisticated realm of integrated voice, graphics and text capabilities.

Microsoft gave a sample CD-ROM disk to each of the 900 conference at-

See **HOME** page 128

McEnaney is a CW West Coast correspondent covering the computer industry.

3Com chairman discusses imminent merger with Convergent

Hopes to help micro network development

By Eddy Goldberg

BOSTON — In 10 days, shareholders of Convergent Technologies, Inc. and 3Com Corp. will meet separately to vote on the merger of the two companies [CW, Dec. 2]. If the union is approved as expected, 3Com founder Robert M. Metcalfe will give up his chairmanship and will see the disappearance of 3Com as a separate entity. But Metcalfe knew he had to give up something to further his vision of networked personal computers.

"What I'm losing," Metcalfe said in an interview last week, "is a certain measure of security, going with a bigger company into a tougher market. But the alternative was a losing proposition."

Metcalfe said he believed that, as a $50 million interconnect company, 3Com would be unable to be a leader in the rapidly growing local-area network market he helped to create. He was not content to stay a small, though successful, company and watch that market grow away from him. As part of a merged company providing both networks and workstations, Metcalfe said he would be more instrumental in promoting his belief in distributed desktop processing.

3Com founder Robert M. Metcalfe

Metcalfe sees the computing industry moving beyond what he calls the first computing millenium of mainframes and batch processing, and the second millenium of time-shared minicomputing. The merger with Convergent is part of his vision of the third millenium in computing: networks of personal computers.

"Manufacturers of the first and second millenia are resisting this evolution and do so at their own risk," he said. He added that IBM delayed its local-area network delivery in order to preserve its stake in mainframe-based computing. "Why else take six years to deliver the Token-Ring?" he asked.

3Com and Convergent have long shared a common vision of work group computing, he said. While 3Com moved its network for personal computers through the retail channel, Convergent moved its clusters of workstations through the OEM channels. Combining the two companies puts all the profits into one corporate basket.

Metcalfe said he sees a new marketing opportunity in the dealer channel, where he said IBM is competing increasingly against its own dealers selling to large and medium-size businesses. In order to remain in this lucrative channel, dealers are looking for vendors that can offer

See **3COM** page 152

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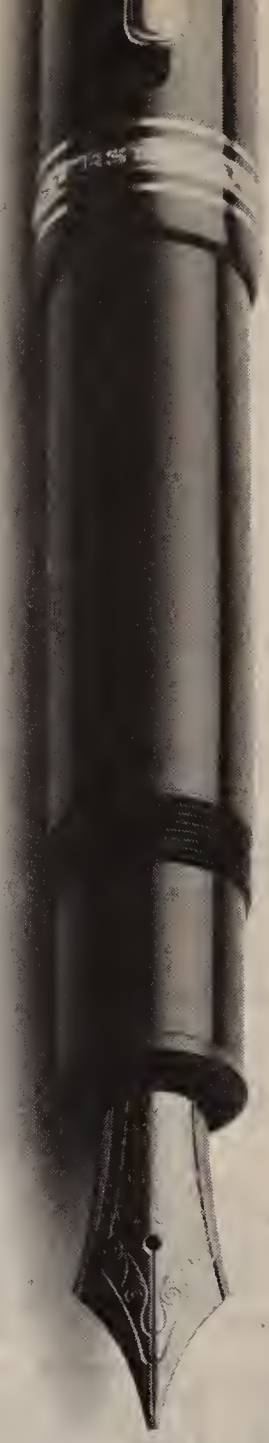

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